Telemedicine & Advanced Technology Research Center (TATRC)

U.S. Army Medical Research and Materiel Command

WELCOME
REPRESENTATIVES FROM:

Morgan State University; Coppin State College; Bowie State University; University of Maryland Eastern Shore; Sojourner Douglass College

U.S. Army Medical Research & Materiel Command

MG Lester Martinez-Lopez, Commanding

Medical Materiel Develop

Deputy for Advanced Technologies

Colonel (Dr) Jeffrey Roller, MC,

Director,
Telemedicine & Advanced Technology Research Center (TATRC)

Mr. Conrad A. Clyburn, MS

Director, Program Integration and Planning
Telemedicine & Advanced Technology Research Center (TATRC)
Program Coordinator
Imaging Science and Information Systems (ISIS) Center, Georgetown University

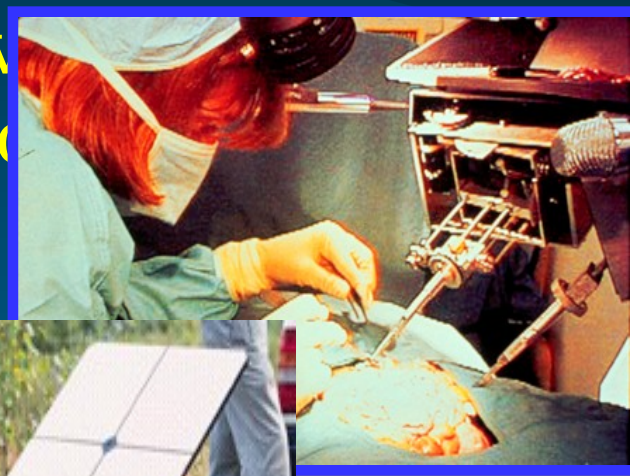
Telemedicine and Adv
Medical Technology Pr

Mission

Apply physiological and medical knowledge, advanced diagnostics, simulations, and effector systems integrated with information and telecommunications for the purposes of enhancing operational and medical decision-making, improving medical training, and delivering medical treatment across all barriers.

The program scope is to identify, explore, and demonstrate key technologies and biomedical principles required to overcome technology barriers that are both medically and militarily unique.

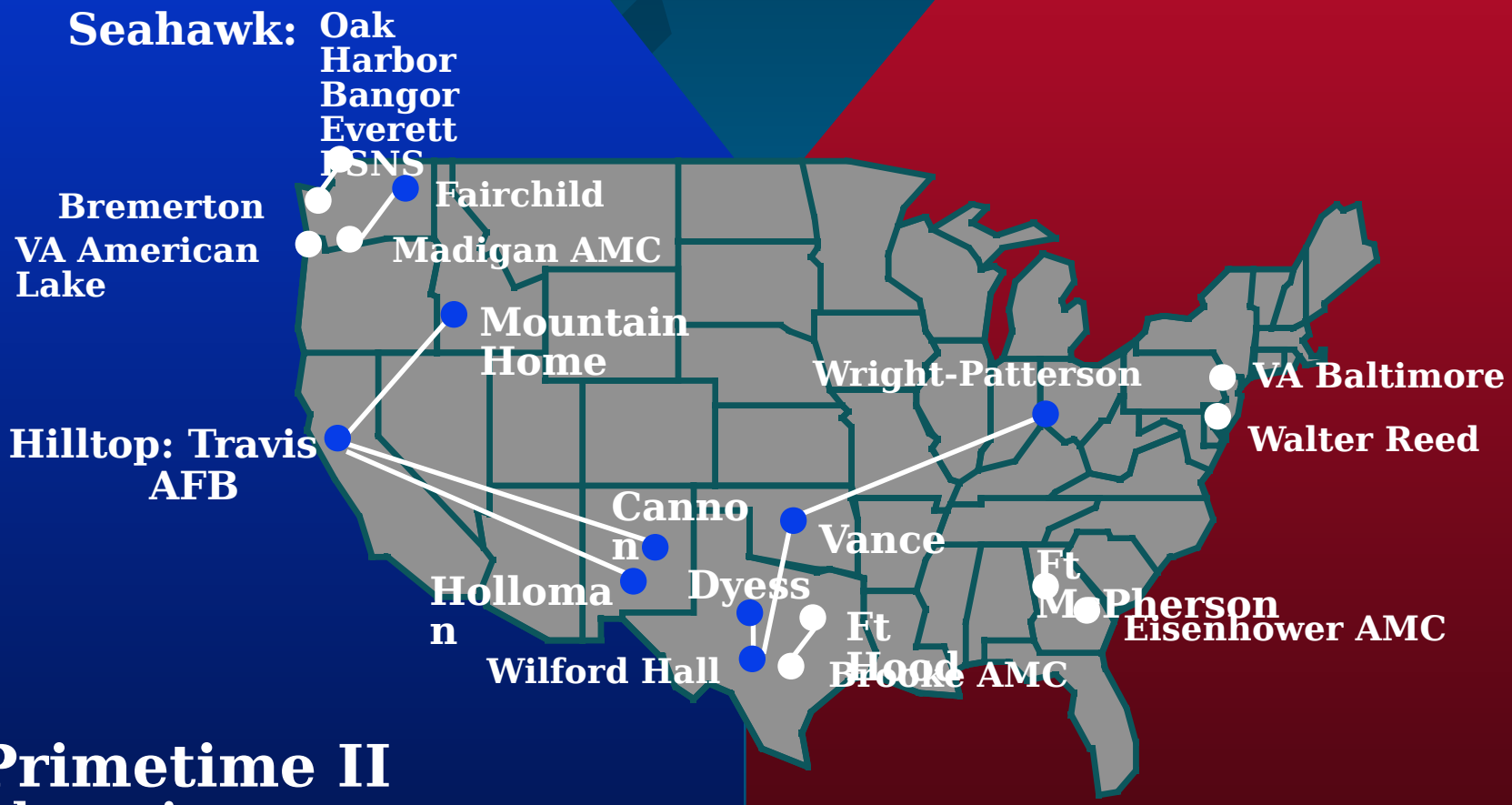
Department of Defense, Joint Warfighting Science and Technology Plan, Chapter IX, Joint Readiness and Logistics, 1999



TATRC History

…An Evolving Science, Technology & Operational Framework

Digital Radiology / Teleradiology Deployed Sites



Primetime II

Akamai: Hawaii/Pacific Rim

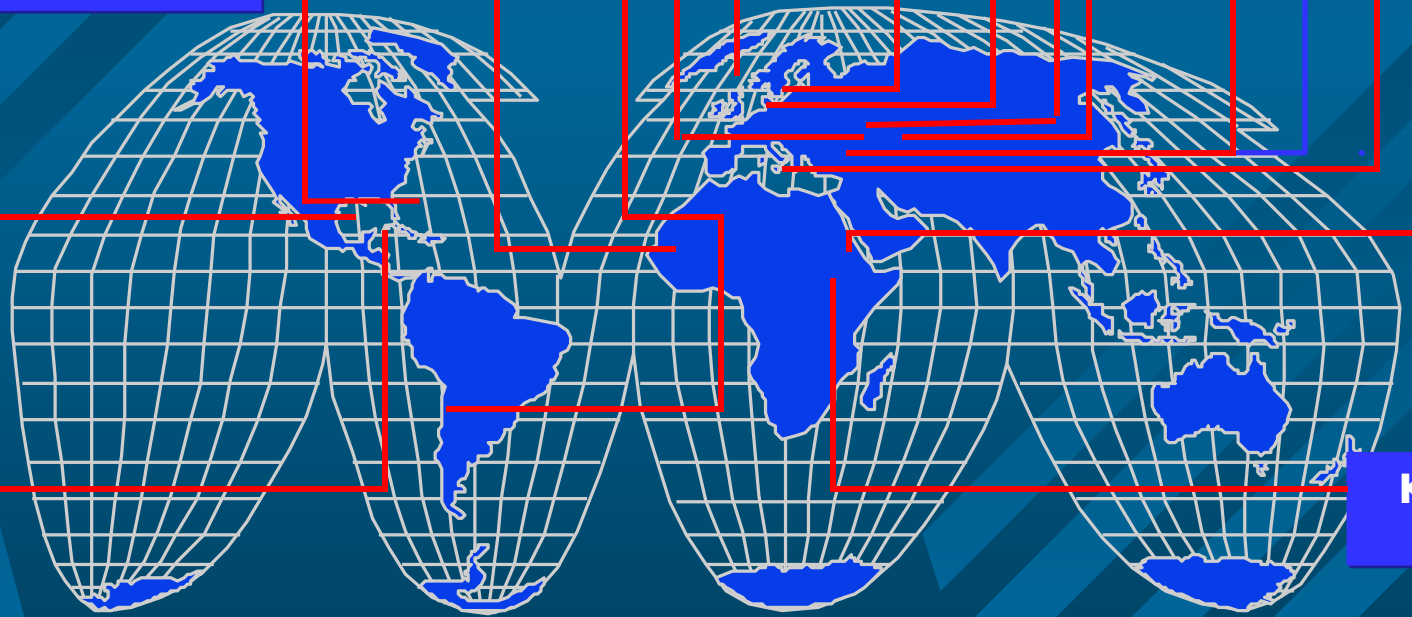
Daybreak: US Forces Korea

Medical Telepresence . . .

. . . Projecting Specialty Care Support in Far-Forward, Difficult-to-Serve Areas.

U.S. Army Telemedicine

Deployed Telemedicine since 1992…



Macedonia 1993

Argentina 1999

Haiti 1995

Croatia 1993

Ivory Coast 1995

Germany 1994

Bosnia 1996

Iraq 2003

Afghanistan 2001

El Salvador,Nicaragua and Guatemala 1998

Kuwait 1994

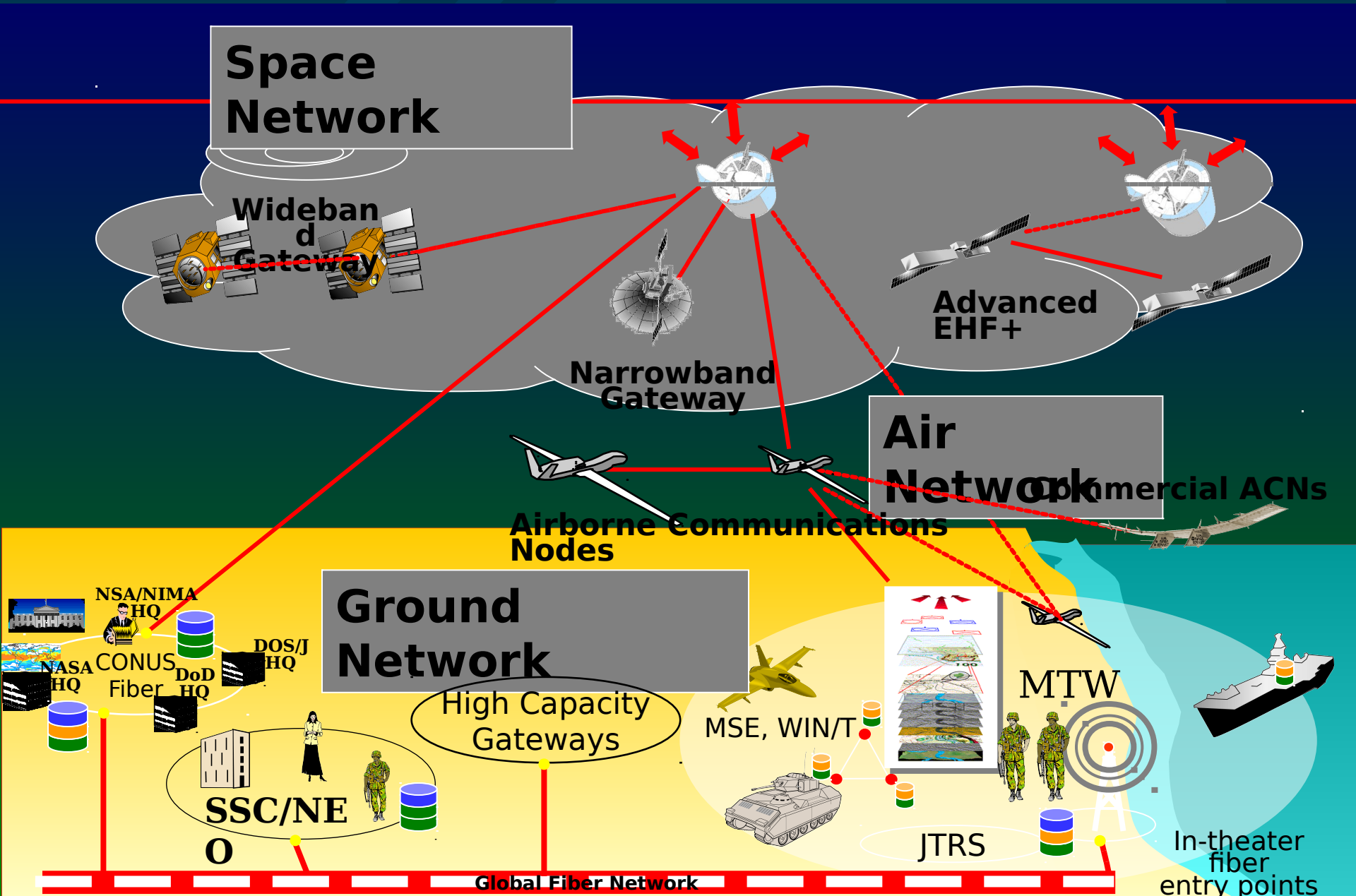
Egypt 1995

Somalia 1993

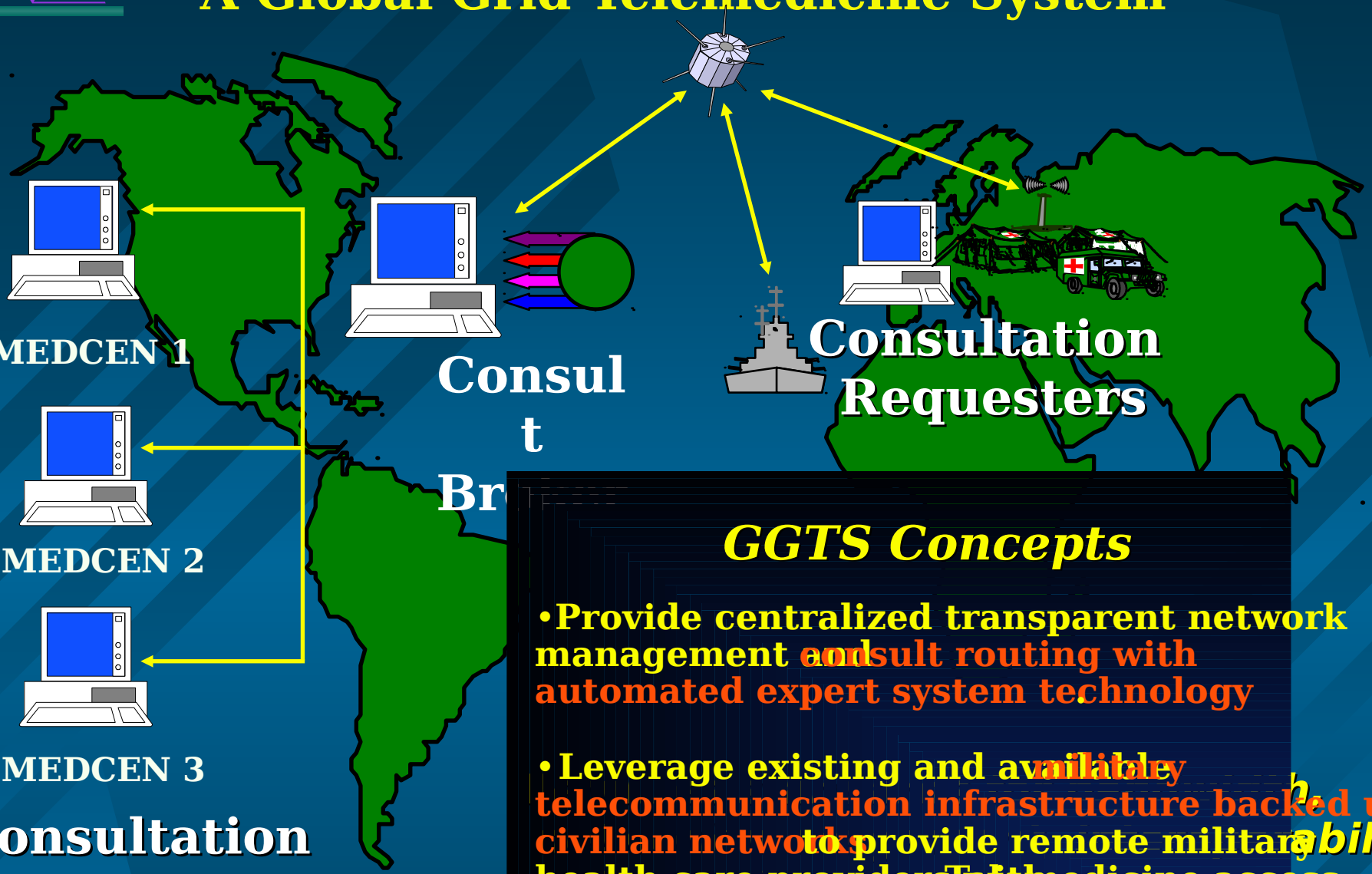
Panama 1995

Kenya 1998

Emerging Hybrid Military – Civilian Architecture



Which Enables....
A Global Grid Telemedicine System

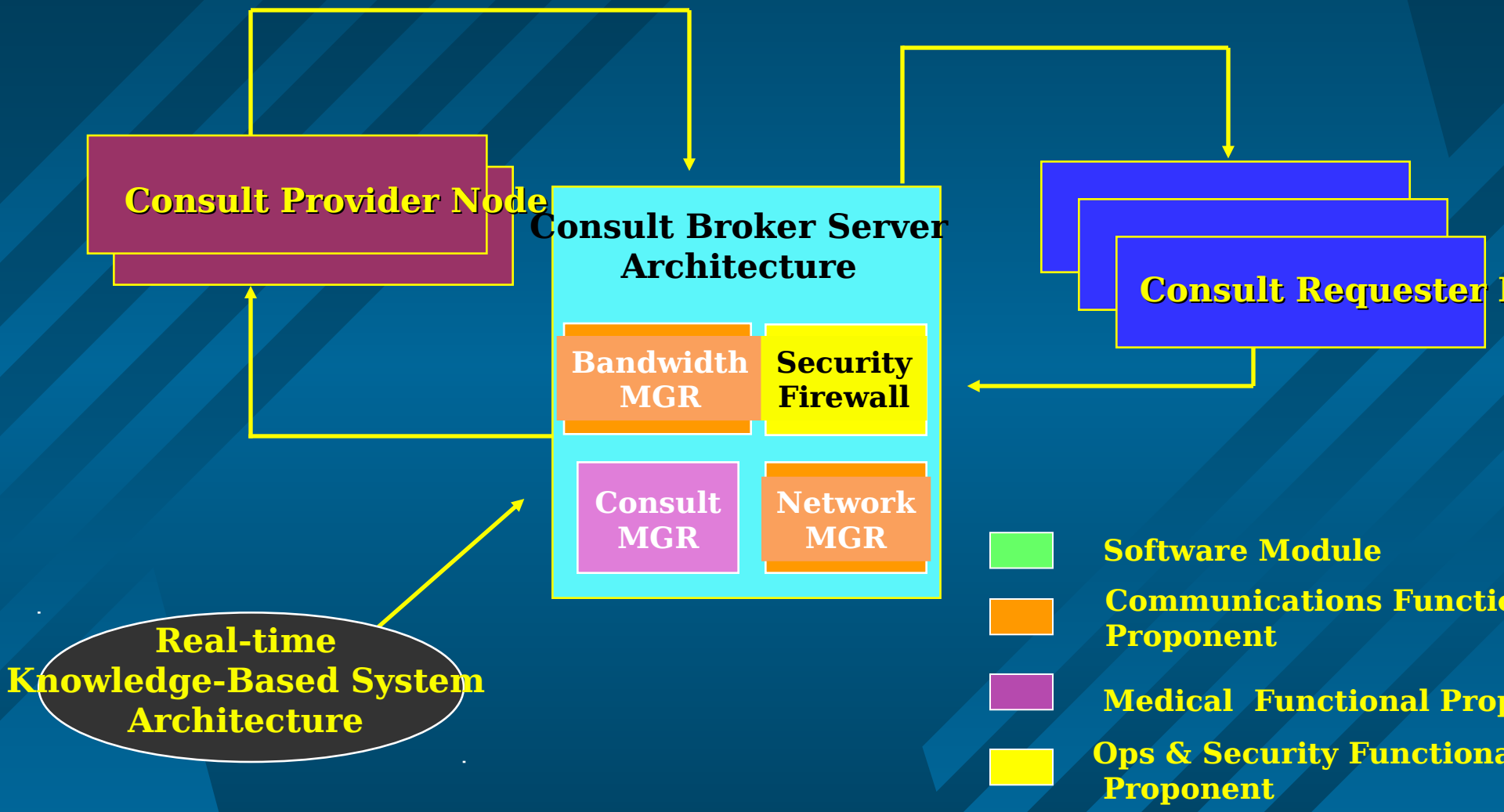


GGTS Concepts

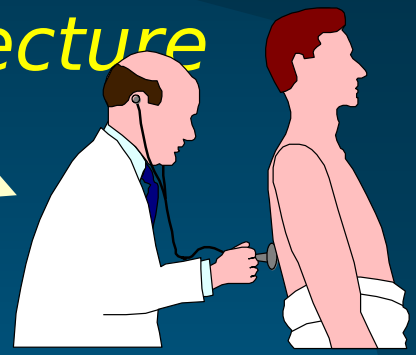
- Provide centralized transparent network management and consult routing with automated expert system technology.
- Leverage existing and available military telecommunication infrastructure backed up civilian networks to provide remote military health care providers with Telemedicine access to USA-based medical centers.

h-
ability

Proposed GGTS System Compone



Which Requires…
A Telemedicine Reference Architecture
"Standards"



Informatics, Robotics, Autonomous systems

Store & Forward & RealtimeTeleconsultation

Virtual systems & Telementoring

Practice Guidelines, Knowledge bases & Reference Materials

The Objective?…

…..The 5 P's of Precision Healthcare

Predictive - Leverage Emerging Developments in Genetics, Bio-Informatics & Multi-Modality Imaging

Preventive - Act Proactively to Prevent Disease

Point of Care - Utilize Mobile Communications, Ubiquitous Computing and Local intelligence

Parametric - Analyze Multi-Parametric Information Referenced to Patient Baseline and Standard Model

Personalized - Individualize Therapeutics to Each

Winning the Race for Speed and Precision ....Transformational Technologies

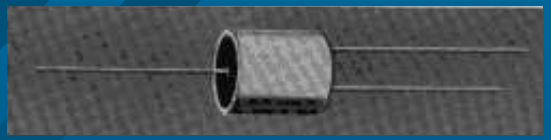
Decade of the 1950's

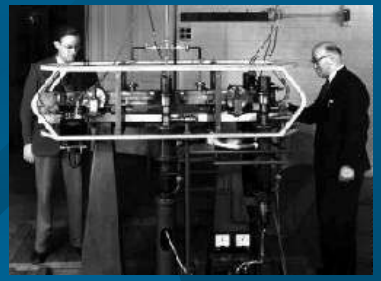
Lasers

Programmable Systems

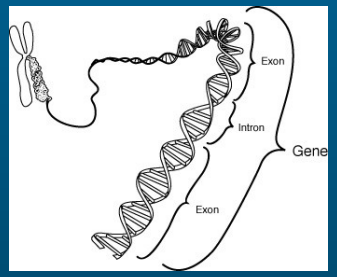
ENIAC

Transistor





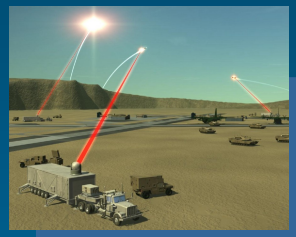
Atomic Clock



DNA

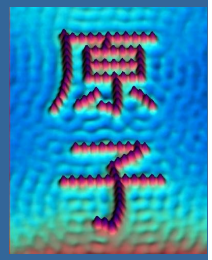
This Decade

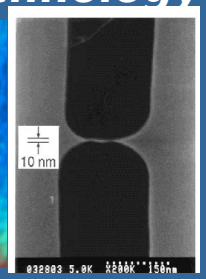
Directed Energy



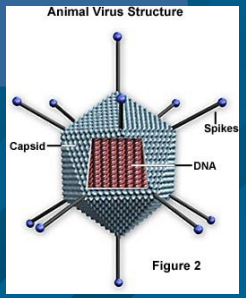
Robotics

Nanotechnology



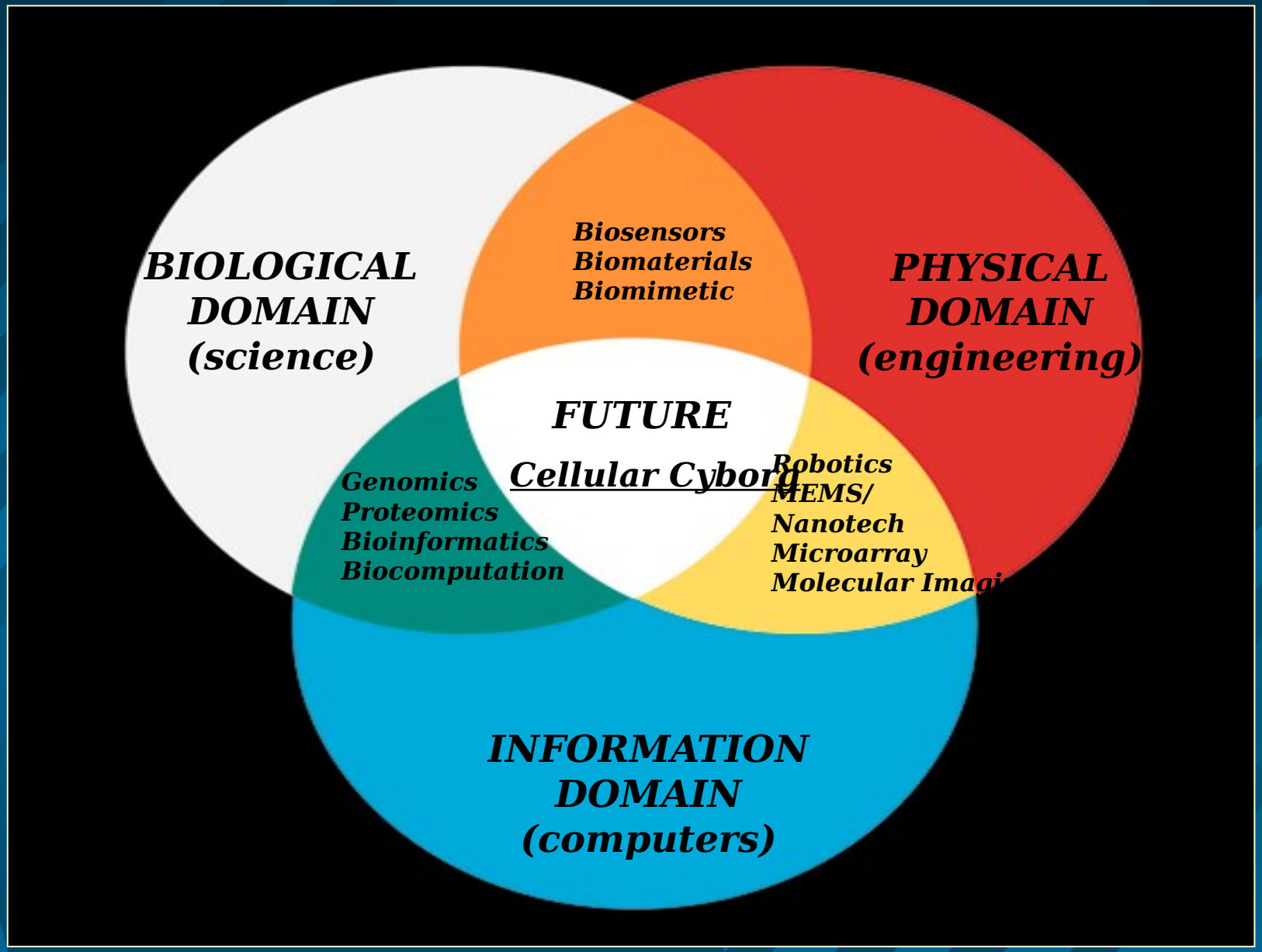


Immersive Environments



Biotechnology

5Ps > Bio Intelligence!



Richard M. Satava, MD
Yale/TATRC/DARPA

A Dynamic Array of Military Missions Require Health Services Support

War / Contingency Operations

Domestic Emergencies

Peacetime Operations

Desert Shield/ Desert Storm

Multiple Regional Contingencies

Civil Defense

Peacekeeping

Zagreb

Noncombatant Evacuation Operations

Liberia

Hurricane Andrew/ North Ridge Earth-quake

Major Regional Contingencies

Civil Disturbance

Foreign Disaster Relief

Rwanda/ Bangladesh

Bosnia

Lesser Regional Conflicts

Catastrophic Disaster

Humanitarian Assistance

Somalia

Haiti

Peace Enforcement

Democracy Promotion

Haiti

Major Disaster

Counter-Drug Operations

Peacekeeping

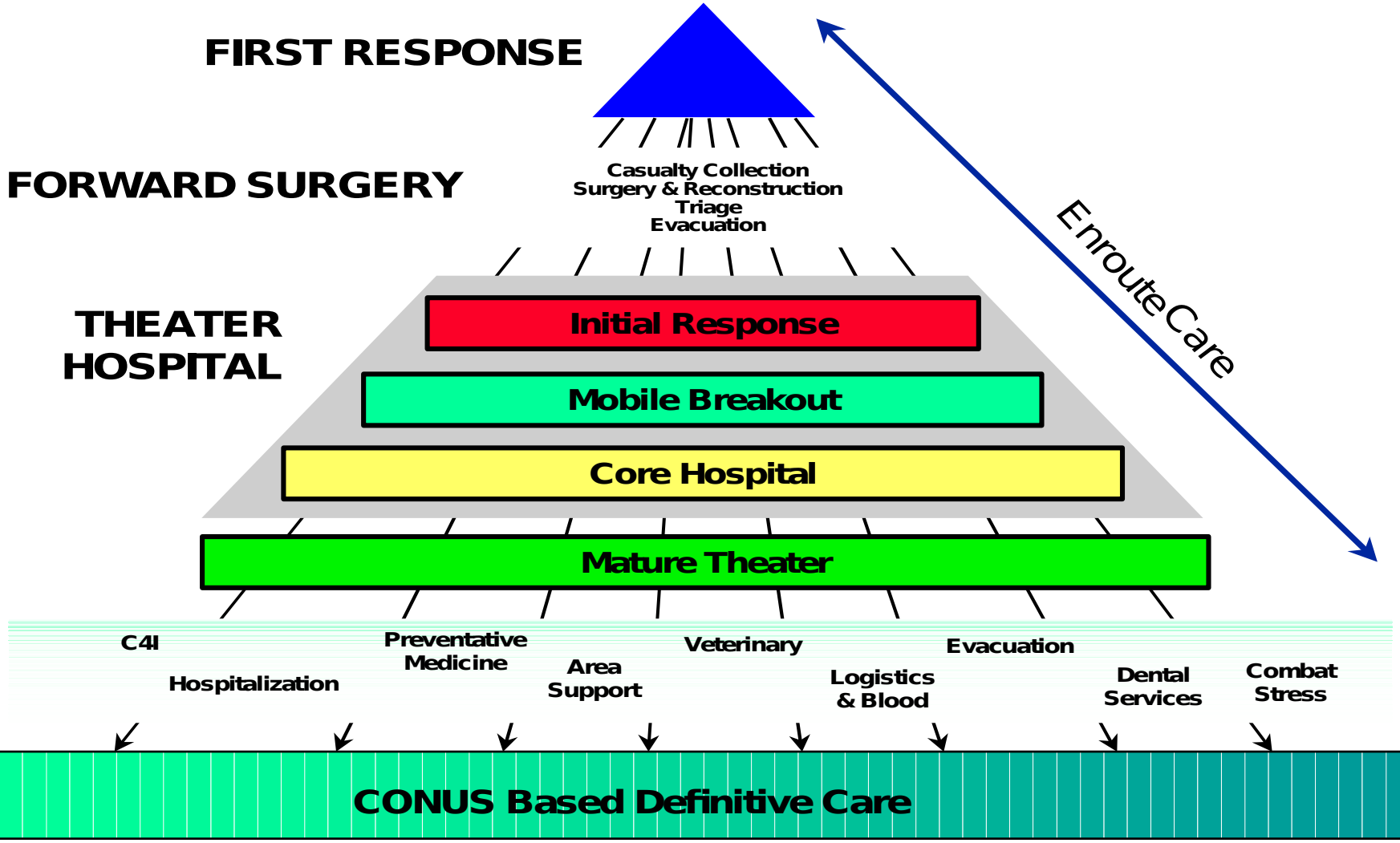
Noncombatant Evacuation Operations

Civil Emergencies

Community Adjustment & Assistance

Oklahoma City

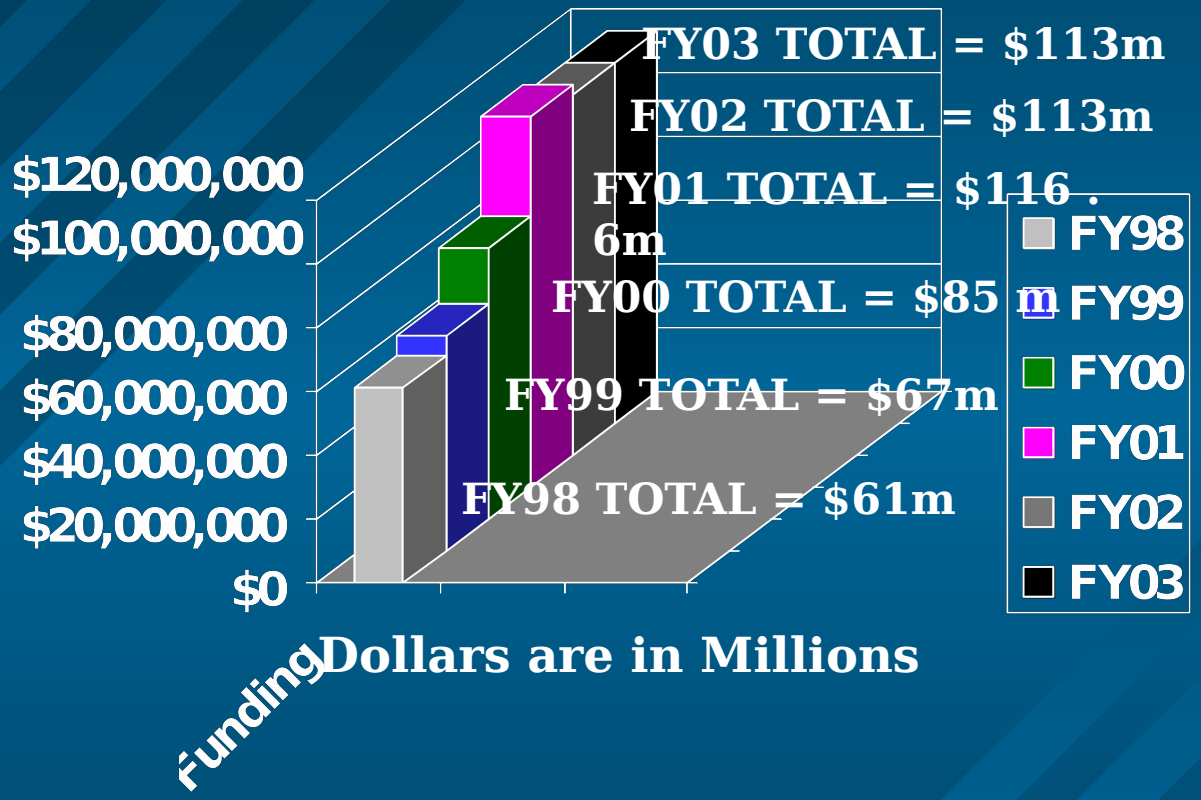
Joint Health Service Support Continuum of Care, JMO-T ACTD Model



Strategies for Non-Traditional Advanced Medical Technology Research and Development

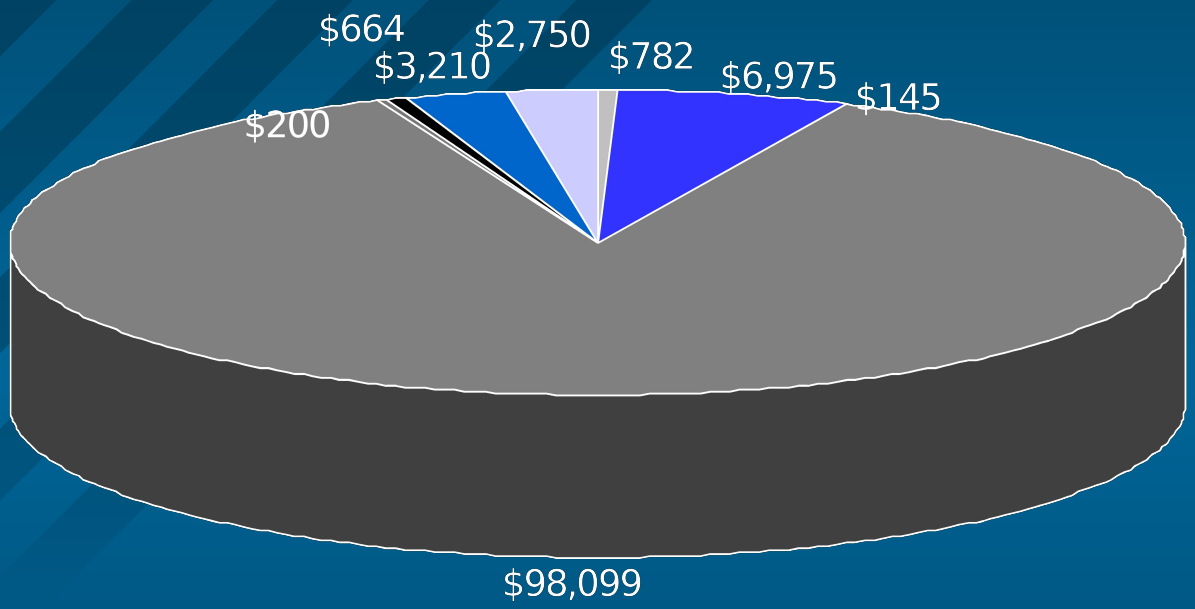
Total Funding

FY03 TOTAL = $113m



TATRC Funding Analysis

FY03 TOTAL $112,825 ($000)



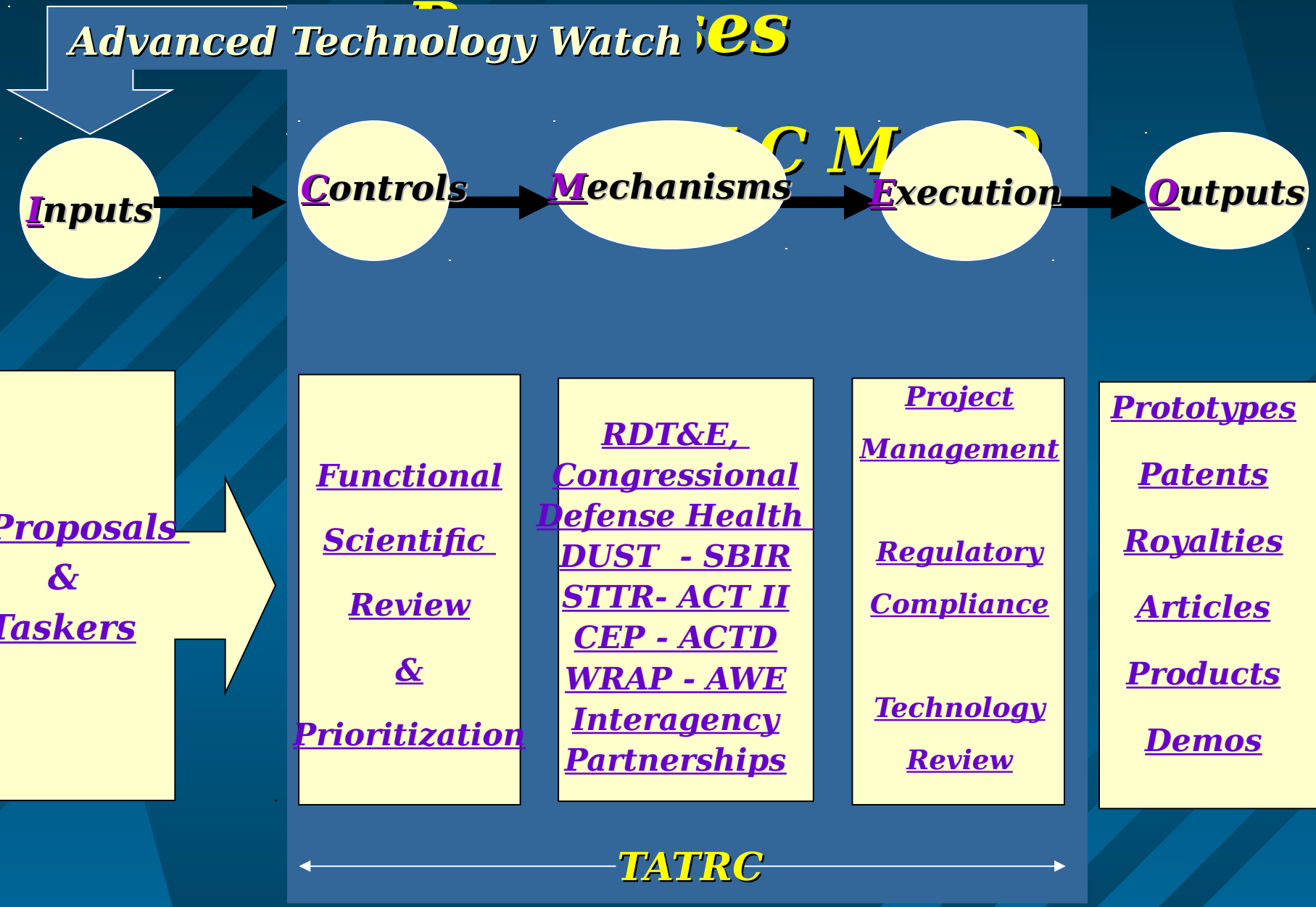
- RDTE, Army =$782k
- DHP, Army =$6,975k
- DHP, TMA = $145
- CSI =$98,099K
- SOCOM =$200k
- PEO, J MIS =$664k
- SBIR/STTR =$3,210k
- DARPA =$2,750k

- $ 782K Army Core provided by RAD 1,2,3,4 for Bioinformatics Cell/Etc..
- $ 98,099K CSI based on congressionals less the DA withholds.
- 33 FY03 Congressional Special Interest Budgets
- $ 6,975 DHP is PT III and 5,000 RFS
- Overhead =10% of portfolio managed

Planning Challenges: Based on Health Care's Future

1) **Major advances in next 10-15 years**
   - Devices, Minimally Invasive Procedures,
   - Imaging, Drug Delivery System
2) **Good News**
   - Enabling technology already exists
3) **Bad News**
   - Major barriers to "exploiting" technology:
   - Clinical Insertion
   - Conventional Life Cycle Management
   - Economic /Regulatory
   - Industrial Involvement
4) **These barriers can be overcome by:**
   - Systematic Culture Blending
   - Committed Experts
   - Individualized Facilitation

Core Business Processes



TATRC
BUSINESS PRACTICES

TATRC manages projects thru Integrated/Multi-Disciplinary Processes

- **Integrated Research Team (IRT)**
  - Program level
  - Periodic, 3 – 5 years
  - Broad strategic planning and oversight
- **Proposal Review Board (PRB)**
  - Project Level
  - Monthly
  - Resource Allocation, Due Diligence
- **Integrated Product Team (IPT)**
  - Project level
  - Periodic, Every Few Months
  - Project-specific guidance
- **Product Line Review (PLR)**
  - Assessments of research by outside experts
  - One research category per month; annual cycle

Organizational Structure

Telemedicine & Advanced Technology Research Center

Logistics, Personnel, Finance

Clinical Applications

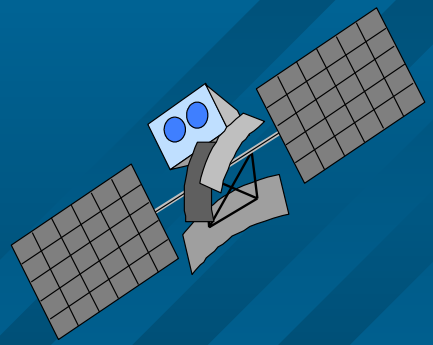
- ***Internet Based TeleConsultation***
  * Teledermatology * Tele-Echocardiography
  * Teledentistry * TelePolysomnography
  * Telepsychiatry * Telegenetics
  * Telepathology * Teleophthlamology
- ***Disease Management***
- ***Surgical Simulation/Virtual Reality***
- ***Medical Imaging (Ultrasound, X-Ray, Optical)***
- ***Energy Delivery Systems (Proton Beam)***
- ***Telepresence***
- ***Telementoring***
- ***Robotics/MEMS***

Information Technology & Engineering

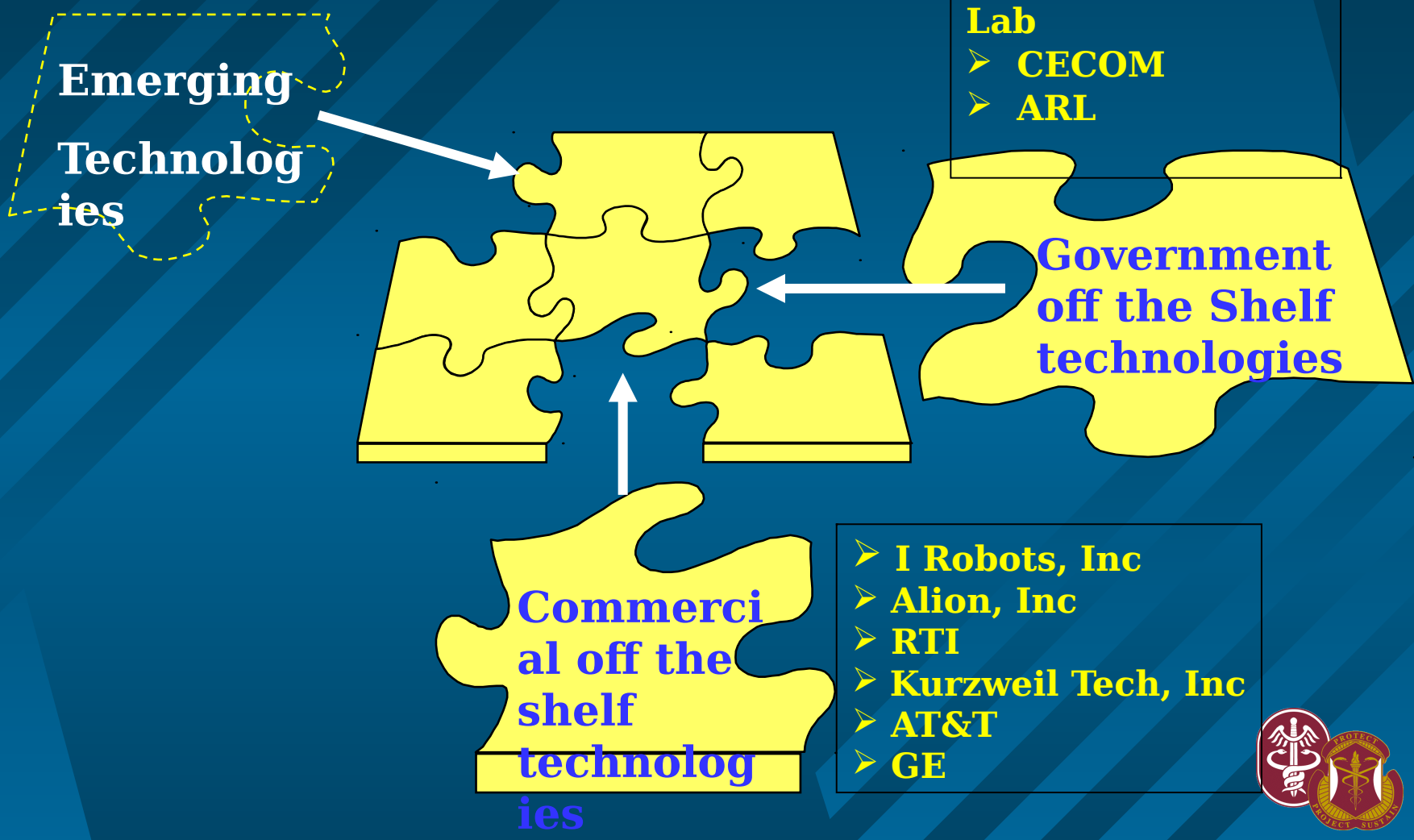
- ***Electronic Medical Records***
  * Personnel Information
  * Patient Data Security
  * Medical Speech Recognition
- ***INTERNET Technology***
  * Next Generation Internet
  * Distance Learning
- ***Knowledge Engineering***
  * Practice Guidelines
  * Global Grid Telemedicine
  * Computer Aided Instruction
- ***Contemporary Operati***
- ***Wireless Medical Syst***
  * Microwave Carrier
  * INMARSAT
  * VSAT Satellites
  * Low Earth Orbit Satel
  * WIN-T
- ***Specialty Response Te***
- ***ACTD/CEP/AWE Supp***

Program Integration

- ***Strategic Planning***
- ***Research Partnerships***
- ***Congressional Programs***
- ***Systems Engineering***
- ***Life Cycle Management***
- ***Proposal Tracking***
- ***Scientific Review***
- ***Funding Mechanisms***
- ***Project Management***
- ***Output Fulfillment***



TATRC - Integrated Prototype Solutio



Leverage … Academic Partnerships

…Basic and Applied Research

- **Georgetown University (CA-Medical Vangaurd)**
- **Howard University (CRDA-Urban Telemed)**
- **Harvard University (CA-CIMIT)**
- **Mass Institute of Technology (CA-CIMIT)**
- **University of Maryland (IPA/CA – ORF)**
- **University of Utah (Contract-Teleopth)**
- **Saint Francis University (CRDA-CERMUSA)**
- **Loma Linda University (CA-NMTB/Proton Beam)**
- **University of Tex - Houston HSC (CA-DREAMS)**
- **University South Florida (CA-Telerad/Adv Cancer Detect)**
- **University of Hawaii (CA-Telemed Curric'lm)**
- **University of Pittsburgh (Contract-GGTS)**
- **Stanford University (Contract-Affiliates Prog)**
- **Yale University (IPA-Adv Tech Watch)**
- **Texas A & M (CA-DREAMS)**
- **Johns Hopkins University (CA-Periscopic MIS)**
- **University of Southern Calfornia (CA-NGI)**

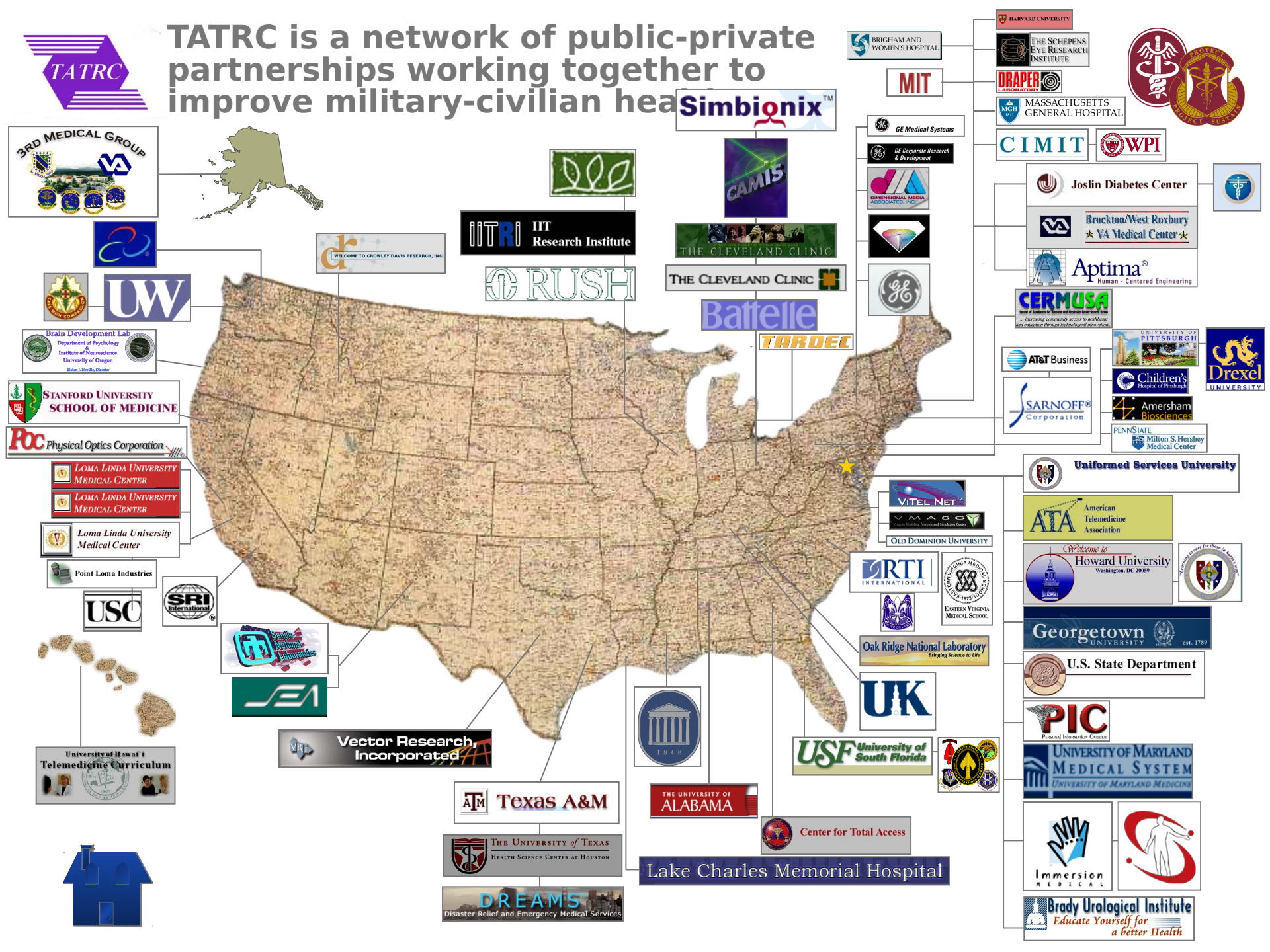
Develop Partnerships... for Non-Medical and Supporting Technologies

R&D Panels and Commands "Partnerships"

- U.S. Army Research Laboratory
- Los Alamos National Laboratory
- Sandia National Laboratory
- U.S. Army, Signal Battle Laboratory
- Commo & Electronic Command
- Oak Ridge National Laboratory
- Veterans Administration
- NASA
- DARPA
- National Library of Medicine (NIH)
- Agency for Health Research & Quality (HHS)

* Distributed, Synchronized Databases
* Advanced, Adaptive Multilevel Security
* Data Mining of Disparate Databases
* Secure Global Positioning System
* Network Management Tools
* Info Warfare Surveillance & Defense Tools
* Artificial Intelligence - Expert Systems
* Fault Avoidance and Recovery Systems
* Hands Free, Wireless Telecom

TATRC is a network of public-private partnerships working together to improve military-civilian hea



International Partnerships

- US/Norway Telemedicine (Wireless, Handheld)
- European Union Collaboration
- NATO – Telemedicine Standardization Committee
- South African Military Health Service (Peacekeeping)
- International Global Satellite System: Poland (CME)
- Landmine Victim Assistance: Central America > Afghanistan
- Partnership for Peace – Romanian Needs Assessment
- Pakistani Exchange Program
- Yuma Proving Ground - Panama Telemedicine
- South Korean Exchange Program
- ATA Symposiums: EU (2001) – Africa (2002) - Latin America (

Accelerate "Flash to Bang" of Medical R&D ....Thru Rapid Protoyping and Spiral Development

Nanomedicine
BioTechnology
Molecular Genetics
Biomateriels
BioSensors

Basic Research

Assured Connectivity
Medical Informatics
Med Training Technologie
Robotics
Therapeutics

Applied Research
Advanced Technolog
Development
Early Prototyping

orward Deployed Digital Systems
Medical Modeling & Simulation
Operating Room of the Future
Wireless Medical Enterprises
IM/IT Systems
Homeland Security Systems
Disease Surveillance Systems
Telemedicine

Demonstration &
V

Technology Transfer

Engineering Manufacturing Development,
Procurement,
Operations & Maintenance

Program Managers for
Army (PM, MC4), Navy, Air Force, DOD, Industry

"System of Systems"

Telemedicine and Advanced Technology

Operational Capability Areas

- **Joint Medical Readiness**
- **Battlespace Medical Awareness**
- **Effective Employment of Medical Forces**

Operational Capability Elements

- Individual Medical Skills Proficiency
- Unit Medical Skills Proficiency
- Information Superiority for Medical Applications
- Physiological Information Acquisition
- Medical Data Fusion & Distribution
- Medical Situational Interfaces
- Medical Force Management
- Improved Evacuation & Treatment

Pre-Deployment
Wellness, Training, Planning, Assessment

Real-Time
Health Monitoring, Measurement, Management

Care Management
Trauma Care
Medical Care
Evacuation

TATRC Science & Technology Portfolio – 200+ Funded Projects

Telemedicine and Advanced Technology

Operational Capability Areas

(www.tatrc.org)

- **Joint Medical Readiness**
- **Battlespace Medical Awareness**
- **Effective Employment of Medical Forces**

Pre-Deployment
Wellness, Training, Planning, Assessment

Real-Time
Health Monitoring, Measurement,Management

Care Management
Trauma Care
Medical Care
Evacuation

Computer Aided Instruction
3D Surgical Simulations
Joint Medical Simulations
Force Feedback - Virtual Reality
Health Care Complex Modeling
Computerized Patient

Physiological Sensors
Microelectromechanical Systems
Digital Image Acquisition Devices
Medical Data Processing
Medical Image & Data Displays
Medical Situational Analysis

Wireless Medical Systems
Teleconsultation Systems
Global Grid Telemed System
Predictive Diagnostics
3D Medical Image Analysis
Minimally Invasive Therapies
Image Guided Therapies
Robotics - Biomaterials

Real Medical Technology ... For The R

IATRC

BMIS-T

Chest Tube Simulator

Digital X-ray

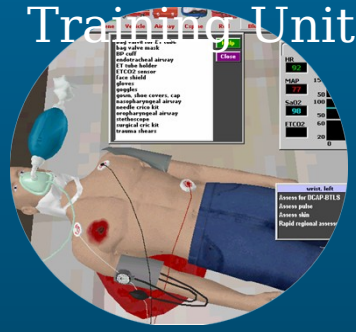
Dreams Digital Ambulance

Smallpox Inoculation

Medical Robotics

Training Unit

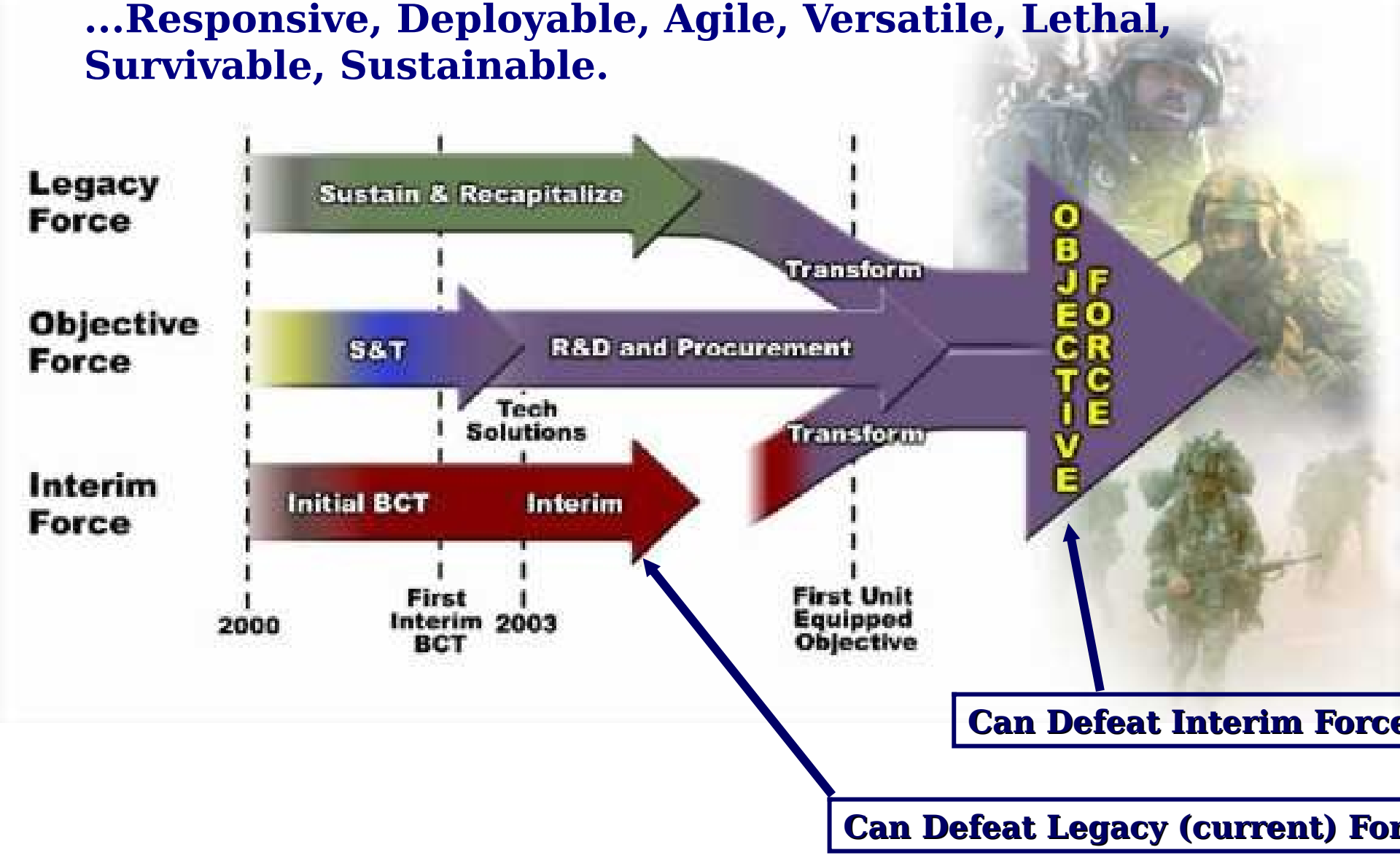
BRSS



STAT-Care

The Army Transformation

…Responsive, Deployable, Agile, Versatile, Lethal, Survivable, Sustainable.



bjective Force Requirements
Medical Mission

- Key to Objective Force is Rapid Deployment
  - Miniaturization of Medical Equipment
  - Tailor-Made Medical Kits
  - Smaller Footprint

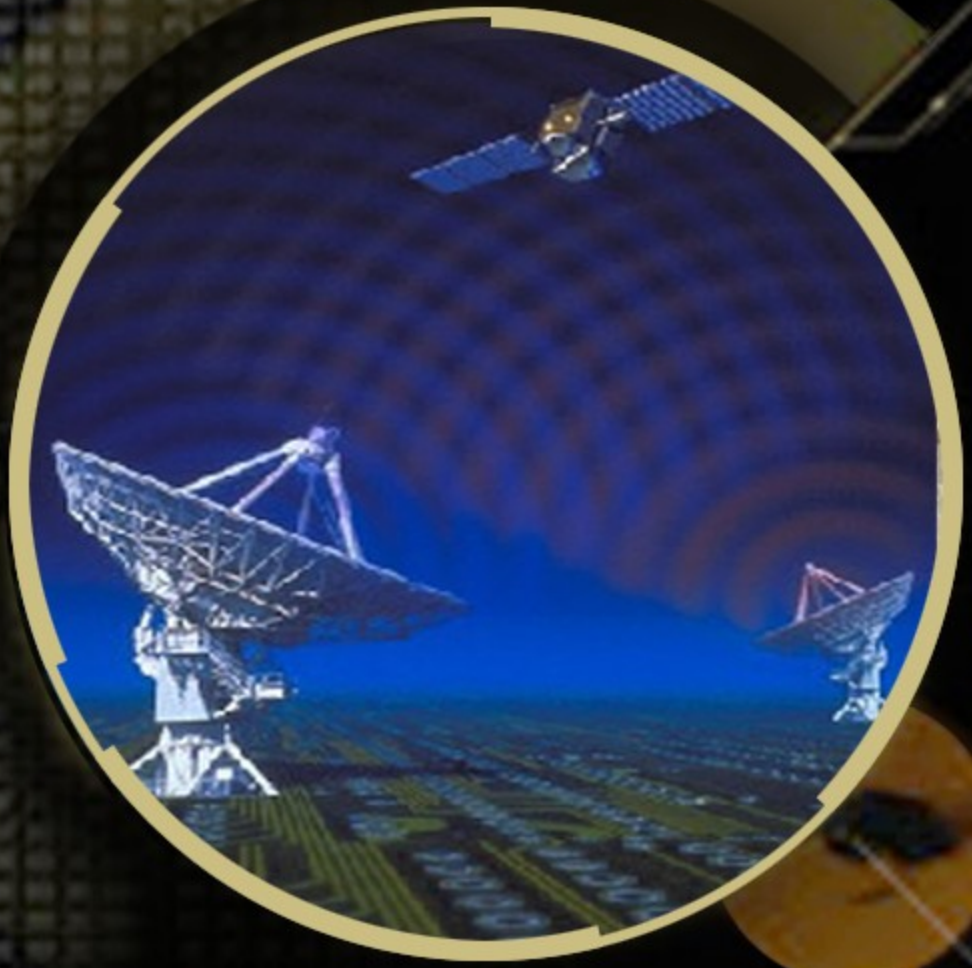
Forward Deployable Digital Medical Treatment Facility (FDDMTF)

- **FCS Block I**
- **Item:** Forward deployable hospital interim to FMMS
- **Capability:** 0-44 bed, C130 rapidly deployable, digitized systems, leverages emerging lighter GOT/COTS technologies
- **Wgt. , cube, & Pwr:** < 1/3 DEPMEDS; FDECU
- **User(s):** FST & CSH Critical Care Holding for Unit of Action
- **Estimated Schedule:**
  - FDDMF Prototype FY02
  - FMSS Prototype FY04
  - Available for fielding: FY08
- **FDA approval:**
- **Funding:** Congressional
- **SORC Supported:** Sustainability, F(8,13); Deployability, B(1,2);

Medical Mission Modeling & Simulation

- **FCS Block I**
- **Item:** Medical Log Planner
- **Capability:** automated mission requirements planning for FST/FDDMTF Commander
- **Wgt. , cube, & Pwr:** runs on PDA or notebook computer
- **User(s):** FST, FCS Medical Platform, CSH Commanders
- **Estimated Schedule:**
  - Prototype for FDDMTF FY02
  - Field test with EMEDS/FDDMTF FY03
  - Available for fielding: FY04
- **FDA approval:**
- **Funding:** Prototype funded
- **SORC Supported:** Sustainability, F(8,13): Agility & Versatility, (C17, 18, 25,28)

bjective Force Requirements
Medical Mission



Communications/Logi
Reachback Capabilitie

-Leverage Expertise Not Found in Theater

-Reduces What is Sent to Theater

bjective Force Requirements
Medical Mission

Universal Access to
Soldier Medical Rec

Computerized Data
Accessed through
Reachback capabilit

Personal Informatio
Carrier on ID Tags

The PDA in the Medical Information Environment

Point of care patient information

Evidence-based me

Research support

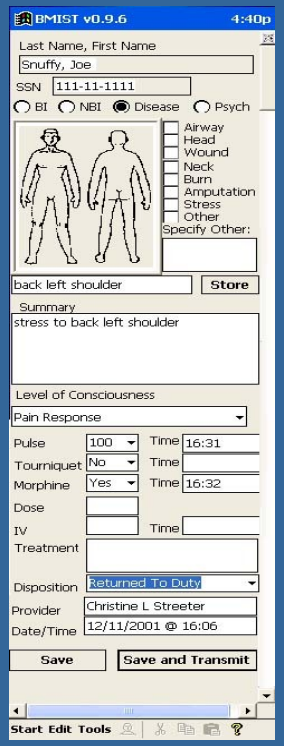
Administrative (billing) support

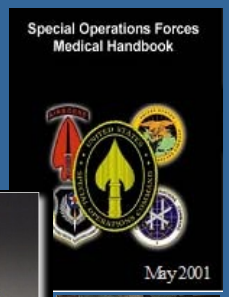
B M I S - T

Battlefield Medical Information System – Telemedicine

Patent pending

Mr Tommy Morris, Telemedicine Project Manager, morris@tatrc.org, Tele 301-619-2072 United States Army Medical Research & Materiel Command, Telemedicine and Advanced Technology Research Center, Fort Detrick, Maryland





Electronic References:
- SOFMH
- Handbook of Veterinary Care
- Medical NBC Battlebook
- MEDIC, Medical Environmental Disease Intelligence & Countermeasures
- Field Operators Guide

- Optimize Patient care
- To establish a true longitudinal Patient record
- To facilitate medical health surveillance
- Improve Health Care

•In use by:

- White House Medical Unit to support the President and Staff
- Special Operations Forces (SOF) Deployment Health Surveillance System (DHSS)

Partners:

United States Army Medical Research & Materiel Command

Loma Linda University Medical Center

NMT

National Medical Technology Testbed

Combat Casualty Care Research Program

United States Special Operations Command

White House Medical Unit

Weight, cube, & P Pocket PC Platform 3.3"x3.3"x.62" 6.7 OZ, BMIST IS Software (No Weight & VDC 2A internal Lithium Polymer (rechargeable)

MDA Medical Applications (All Participants)

Rank of mean	User Needs Assessment of Medical Digital Assistants (MDAs) in Clinical Practice Application	Mean ranking
1	Drug Formularies (e.g., ePocrates, Tarascon, Lexidrug)	2.1
2	Reference materials Textbooks, manuals (e.g., Harrison's, Merck Manual, Wash U., Harriet Lane)	3.2
3	Medical Calculations (e.g., MedCalc)	4.3
4	Patient Data retrieval, H&P, Lab, X-ray	4.4
5	Patient Data entry (e.g., PatientKeeper, Patient Tracker)	4.8
6	Treatment Guidelines (e.g., ATP III, Shots)	5.5
7	Decision Support (e.g., 5 Min Clinical Consult)	6.0
8	Administrative (e.g., ICD coding, visit coding)	8.0
9	CME – multiple topics	8.2
10	Prescription Writing	8.5

Personal Information Carrier (PIC)

Cost – (option year 2 – 10 Sep 01 to 09 Sept 02)

(1) 8mb PIC is $16.81
(2) 16mb PIC is $24.15
(3) 32mb PIC is $34.55
(4) 64mb PIC is $80.85
(5) 96mb PIC is $117.60
(6) 128mb PIC price estimate is not available as of 26 Sep 2001 (NOTE: every 24mb increase should decrease the price by approximately 12%).
(7) PIC PCMCIA adapter is $39.64.

- ***Cross platform compatibility and universal read/write access without special drivers or middleware were objectives.***
- ***Used standard PCMCIA interface and standard OS drivers.***
- ***To be effective will require standard clinical nomenclature, data representation, and security features.***

Forward Deployable Digital Medical Treatment Facility (FDDMTF)

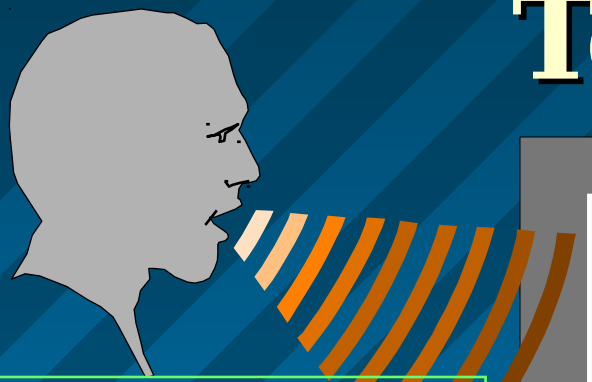
Medical Information Systems Applications

- CHCSII Theater (TMIP patient encounter module)
- Global Expeditionary Medical System (GEMS) organic to EMEDS
- MC4 Personal Data Assistant Electronic Field Medical Card
- Personal Information Carrier integration to above
- Dynamic Transfer System Radiology Imaging and Picture Archiving Communications System (PACS)
- Special Forces Operations Medical Handbook/Special Operations Medical Diagnostic System
- Other handheld/wireless applications as nominated by TATRC Wireless Medical Enterprise Working Group

Defense Healthcare Information Assurance Program

- Web-based Toolkit
- Certification & Accreditation Pro
- Release of Electronic Information
- Compliance with HIPAA Outcome

Natural Language Technology



Speech/Voice Recognition

S: 25 year old AD Army white male complains of .....

FD

R

Structured Text

Age: 25
Status: AD
Service: Army
Race: Whit
Gender: Male

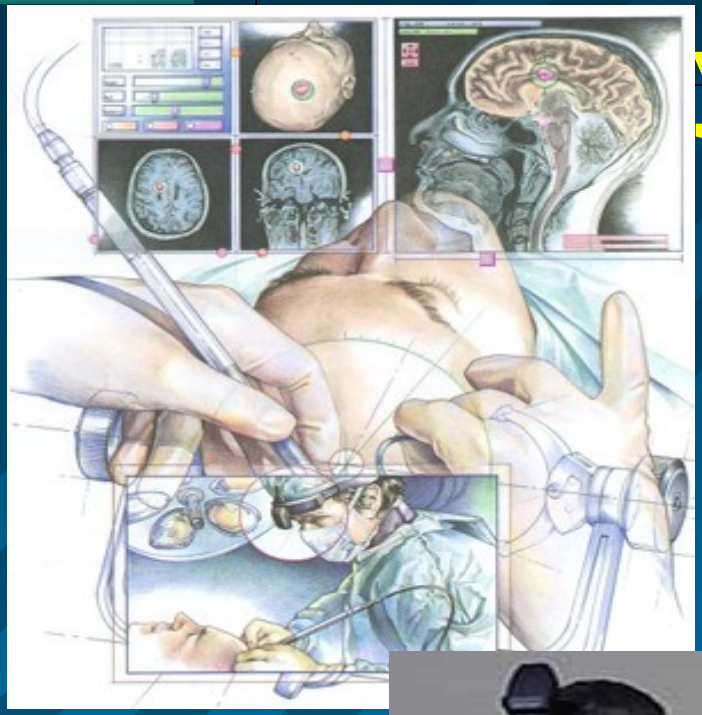
Speech Capable PDA

Wireless Headset and Microphone with Voice Control

Planning System Inc

- **FCS Block I**
- **Item:** Speech capable PDA
- **Capability:** Speech input to provider's PDA; hands free PDA operation
- **Wgt. , cube, & Pwr:** < .25 pound; Powered by rechargable battery
- **User(s):** Combat medic, physician assistant, physician & other providers, FST, FCS Platform, CSH
- **Estimated Schedule:**
  - Prototype Acoustic Array microphone & Speech Recognizer FY04
  - Ruggedized PDA field tests FY06
  - Available for fielding: FY08
- **FDA approval:**
- **Funding:** Congressional
- **SORC Supported:** Sustainability, F(8,13); Agility & Versatility, (C17, 25, 27,28)

Virtual Retina Laser Computer Display

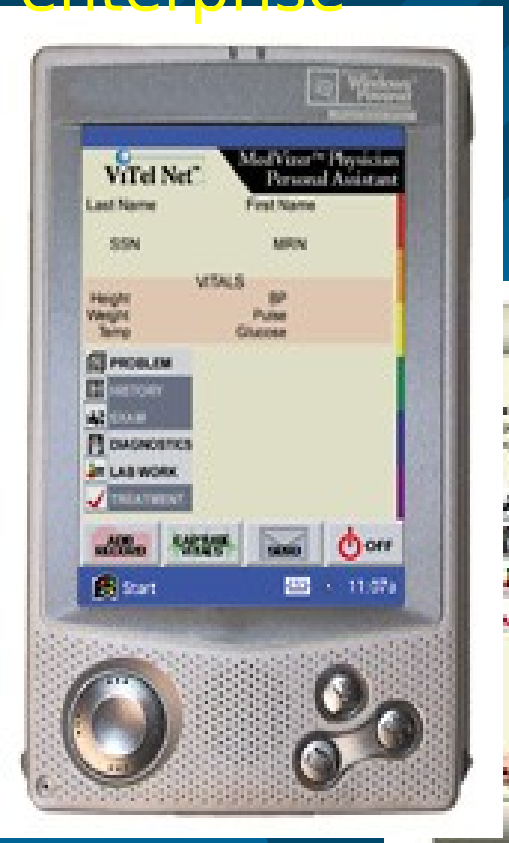


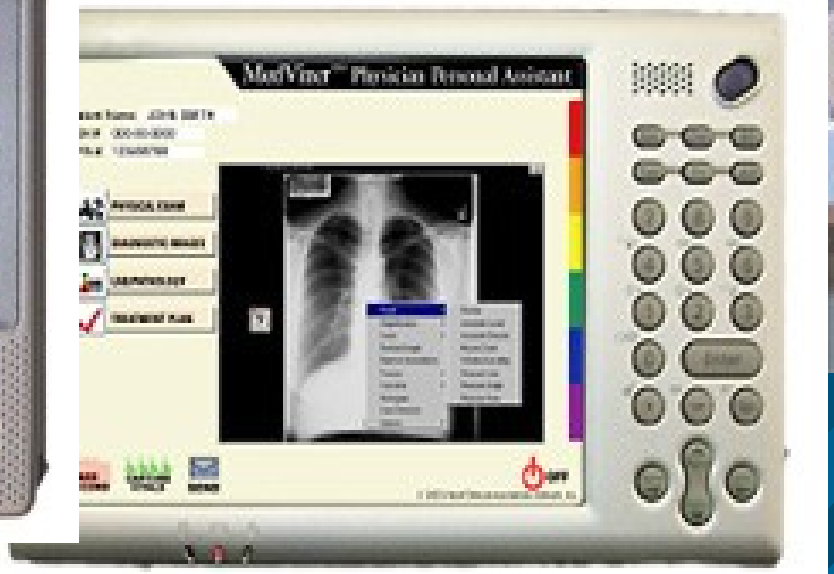
Microvision Inc

- **FCS Block I**
- **Item:** Virtual Retina Laser Computer Display
- **Capability:** Hands-free Computer and PDA display
- **Wgt. , cube, & Pwr:** < 1 pound; Powered by rechargable battery
- **User(s):** Combat medic, physician assistant, physician & other providers, FST, FCS platform, CSH
- **Estimated Schedule:**
  - Wired wearable Prototype FY03
  - Ruggedized miniature wireless field tests FY05
  - Available for fielding: FY08
- **FDA approval:**
- **Funding:** Congressional
- **SORC Supported:** Sustainability, F(8,13); Agility & Versatility, (C17, 25, 27,28)

U.S. – Norwegian Military Telemedicine Collaboration

Physician Point of Care in the wireless medical enterprise





SMART-MC3T

Special Medical Augmentation Response Team – Medical Command, Control, Communication, Telemedicine Set

Mr Tommy Morris, Telemedicine Project Manager, morris@tatrc.org, Tele 301-619-2072, **Ms Renee Clerici**, Project Officer, clerici@tatrc.org, 301-619-7922, United States Army Medical Research & Materiel Command, Telemedicine and Advanced Technology Research Center, Fort Detrick, Maryland

Original Telemedicine Set, 1993

- 330 lbs
- $150K
- 40 cubic feet

Telemedicine Set, 1997

- 112 lbs
- 6 cubic feet
- $68K

Current Telemedicine Set, 2003

- Rugged/ Waterproof shipping container (Left)
- Color Coded cables (Left)
- Solar power augmentation
- Printer/Scanner

Telemedicine portion (Right) provides:

- M4 INMARSAT terminal
- Rugged laptop
- Video Conferencing
- 2 Digitally Enhanced Cordless phones
- 4.1 Mega Pixel digital camera
- Built in Universal power supply capable of running entire set for 3 hours on a single charge
- Standard USB interfaces

Capability: When MEDCOM deploys any variety of SMART teams, they will need to communicate. The other types of teams will rely on the MC3T team and equipment for all their reach back communications from the current theater of operations. Each MC3T set is capable of providing a satellite based link from anywhere to anywhere. This link will provide the users with voice capabilities, Video Teleconference (VTC) connections, and high speed data connectivity – for accessing Internet based applications, utilizing email services, sending files (such as images), and accessing online documentation that may be needed to accomplish the mission.

Estimated Fielding Schedule:
Summer 2003

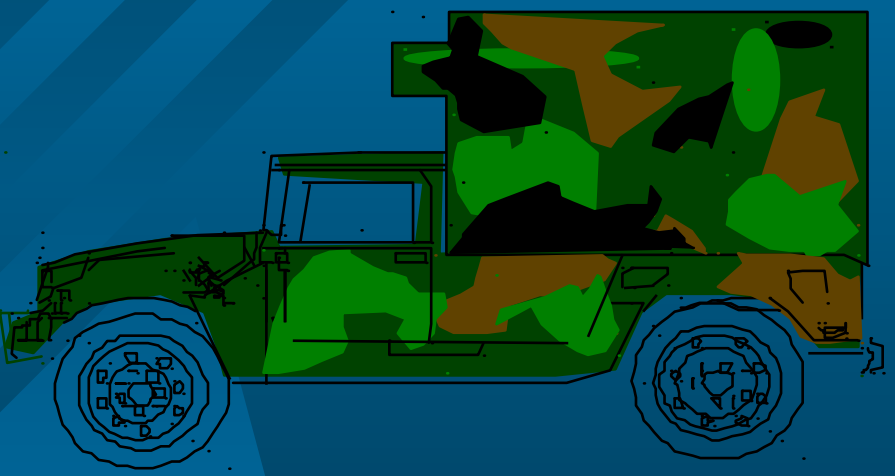
Facts.

- The SMARTs deploy on order of Headquarters, Department of the Army Surgeon General (HQDASG) and USAMEDCOM, at the request of legitimate civil, state, federal or defense authorities. The teams provide short duration, augmentation to regional domestic, federal and defense agencies responding to Anti-Terrorism, Homeland Security, disasters, civil-military cooperative actions, humanitarian and emergency incidents throughout or outside their region. The main objective is to provide local authorities with medical situational awareness and telemedicine services.
- The SMART MC3-T is a complete, stand alone, deployable telemedicine set. Consisting of a variety of communication equipment from the INMARSAT & Motorola radios and a cellular phone, a digital camera, computer equipment including a lunchbox computer, a laptop, a printer and networking equipment. It also ships with a generator and UPS to assure continuous, uninterrupted operations.
- The SMART MC3-T was rapidly prototyped, developed and deployed in under 6 months. It was developed on time and under budget. In November 1998, the first SMART MC3-T deployed to El Salvador to assist in relief efforts in the wake of Hurricane Mitch. They provided medical humanitarian assistance and preventive medicine assessments for the Joint Task Force (JTF); they were the only JTF source for e-mail and immediate access to disaster relief information for the first three weeks of the relief effort.
- The SMART MC3T package is rapidly deployable and re-deployable, Increases situational awareness-anytime, anywhere, enables soldiers to establish medical communications. This provides real-time and near real-time command and control and helps to maintains the standard of care for deployed soldiers sailors and airmen.

WIN-POC Proof of Concept Switch

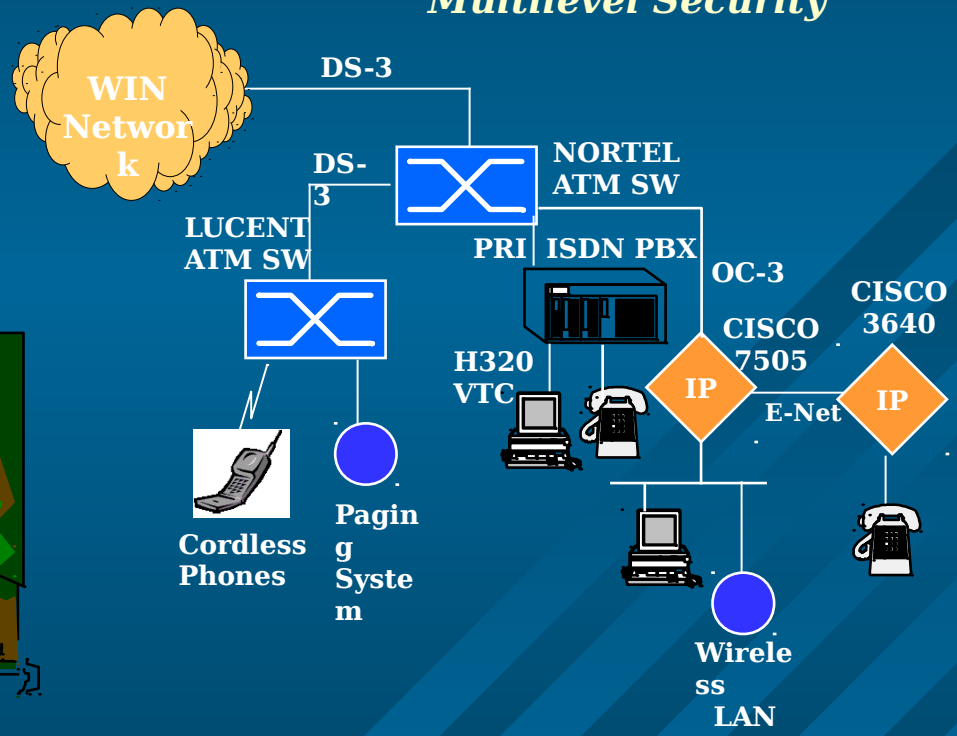
Switch embedded Network services

- ATM Switch
- IP Router
- Paging System
- Cordless Phones
- Wireless LAN

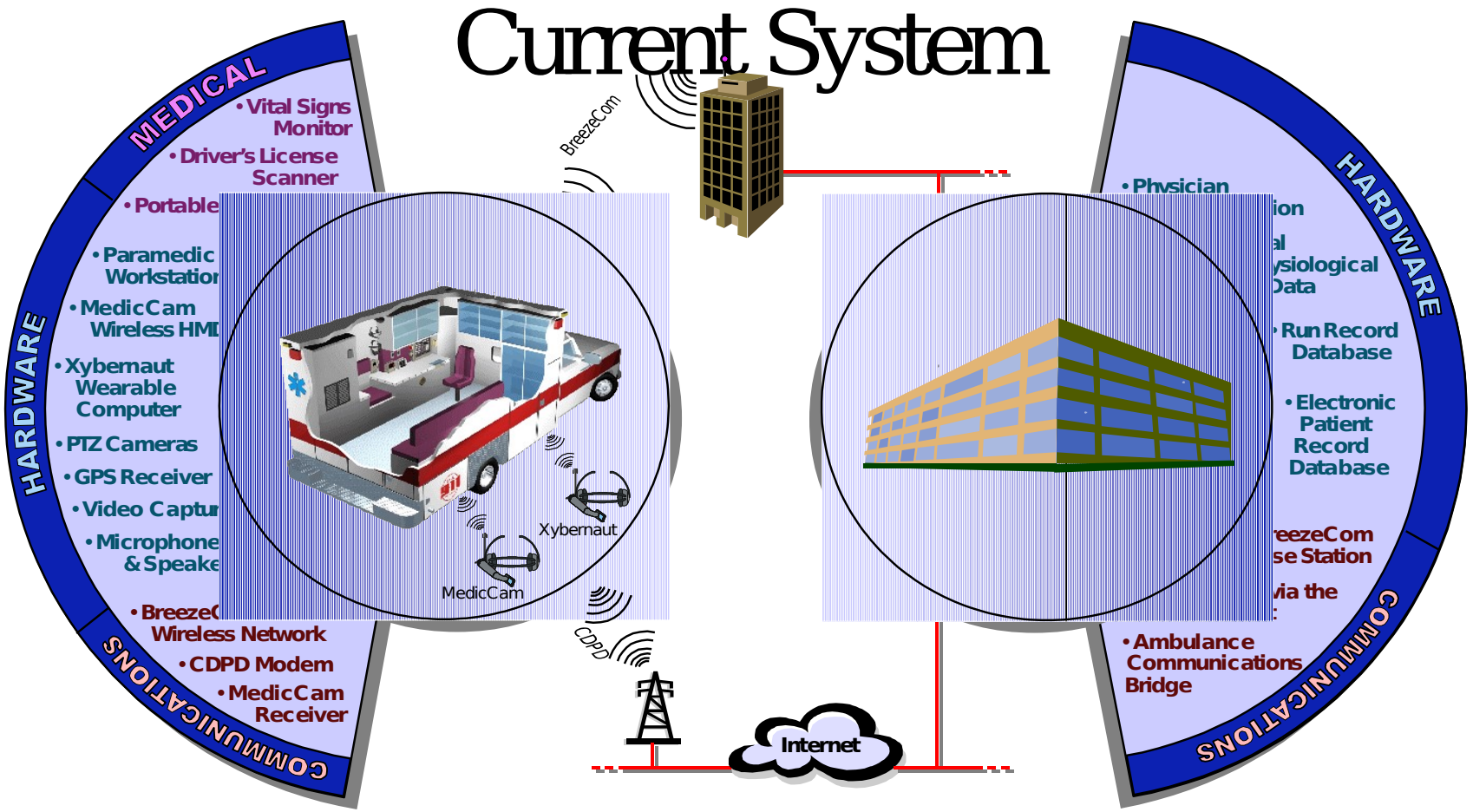


Warfighter Information Age Services

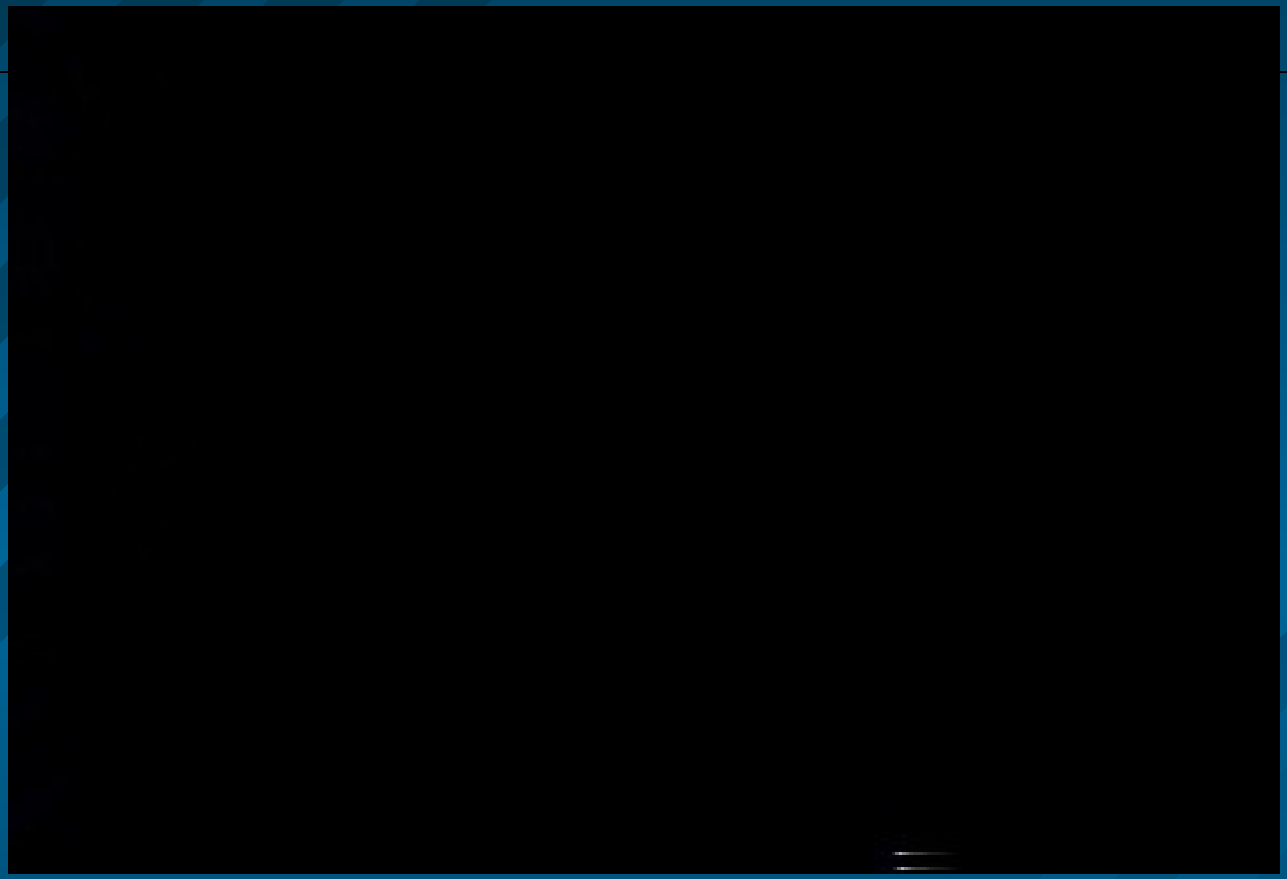
Multimedia Services (voice, data, video, image
Wireless Lan Networks
Cellular Services
Automatic Dial-up Video Teleconerencing
ISDN Ethernet Gateway for remote users
Multilevel Security



Disaster Relief & Emergency Medical



NBC News Coverage

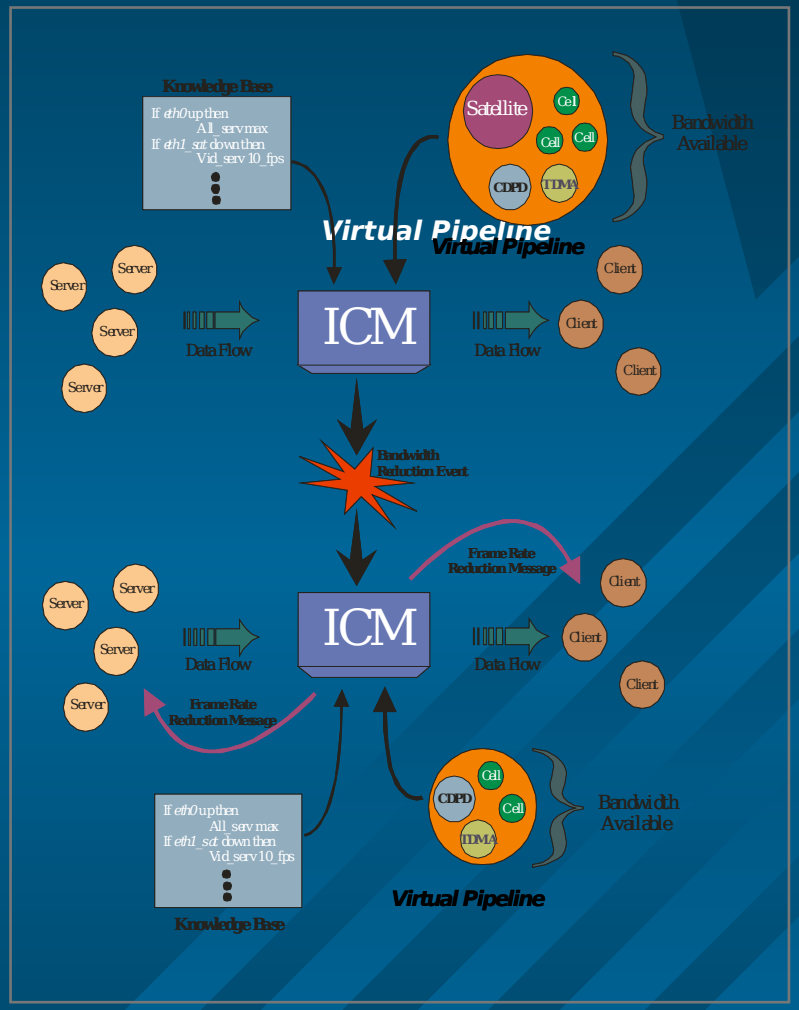


The University of Texas Houston Health Science Center

Texas Engineering Experiment Station

DREAMS: Intelligent Communications Manager (ICM)

- Provides intelligent communications management across multiple heterogeneous devices based on the following parameters:
  - Bandwidth
  - Reliability (Availability)
  - Cost
  - Data priority
  - Rule effects
- Inference engine uses a rule base for making decisions which affect system data providers.
- Applications in the system register with the ICM and expose a controllable interface which is used for management of data streams through a callback interface.



Virtual Pipeline

DREAMS: Deployable Telemedicine System (DTS)

- A transportable, ruggedized telemedicine system that offers the relevant capabilities deployed on the Digital EMS ambulance.
  - *Physiological Telemetry*
  - *Integrated Medical Diagnostic Equipment*
  - *Remotely Controlled Cameras*
  - *Embedded Medical Informatics*
- Can serve as either the treatment center or the physician's workstation.
- Can be used at field hospitals, community centers, etc.

Homeland Security ACT

December Technical Demonstration

September 3, 2016

Jim Southerland
Technical Architect, HLS C2
ACTD
southj@jwfc.jfcom.mil
(757) 686-7111

TATRC HLS-Relevant Projects & Collaborators

- Biodetection
- Environmental Sensing
- Medical Surveillance
- Communication Systems Integration
- Education & Preparedness

HLS C2 Focus Area I:

Assured Connectivity

Goal

- Preserve the ability to coordinate federal, state, and local activities during periods of high network disruption
- Communications at an appropriate level of security

ACTD Solution

- Provide real-time communications links between DoD and Federal elements
- Provide necessary bandwidth to each echelon
- Provide required level(s) of QoS and secure communications at each echelon
- Interface with civil communications links with DoD capabilities

HLS C2 Focus Area II: Threat Attribution

Goal

- Assess and track threats across multiple information domains
- Provide high-confidence, timely alerts
- Intelligence sharing

ACTD Solution

- Aggregate, correlate, and exchange threat information from Federal and DoD sources for applicable incident(s) and crises
- Disseminate intelligence products to all echelons, released at appropriate security levels for the environment
- Recognize emerging threats beyond current incidents and provide warnings for prevention and deterrence before crises occur

HLS C2 Focus Area III: Command, Control & Coordination

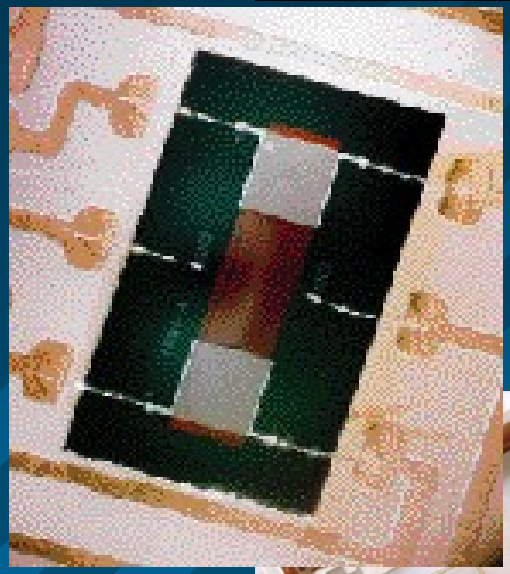
Goal

- Manage coordinated responses at Federal, State, and Local levels
- Consequence Management, Crisis Response, Deterrence, Prevention, Prediction

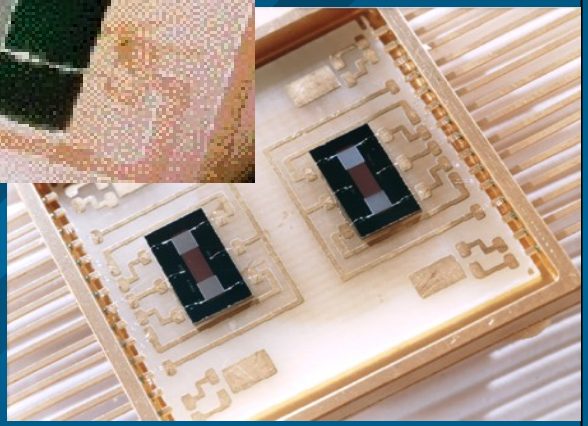
ACTD Solution

- Collaborate among DoD and Federal agencies
- Exchange situational awareness information from incident site, local, state, and NG Emergency Operations Centers
- Inform and alert all echelons down to lowest Federal responder
- Provide interagency coordination capability

MicroElectroMechanical Systems (MEMS): Realtime Biochemical Assays



MEMS Biochemical Sensor



- **FCS Block II**
- **Item:** MEMS Realtime Assays
- **Capability:** **Realtime, minimally invasive analysis of blood samples and tissue fluids in trauma care, CW/BW.**.
- **Wgt. , cube, & Pwr:** < 1 oz; self powered
- **User(s):** physician assistant, physician & other providers, FST, CSH
- **Estimated Schedule:**
  - R&D FY02-07 Anthrax sensor FY04
  - Operational Testing FY08
  - Available for fielding: FY12
- **FDA approval:** Required
- **Funding:** Congressional
- **SORC Supported:** Sustainability, F(13)

•Microbiology of Salmonella, E. Coli O:157, Shigella Dysentery, Legionella, Listeria Mono Cytogenes

–Dr. Stephen Calderwood,

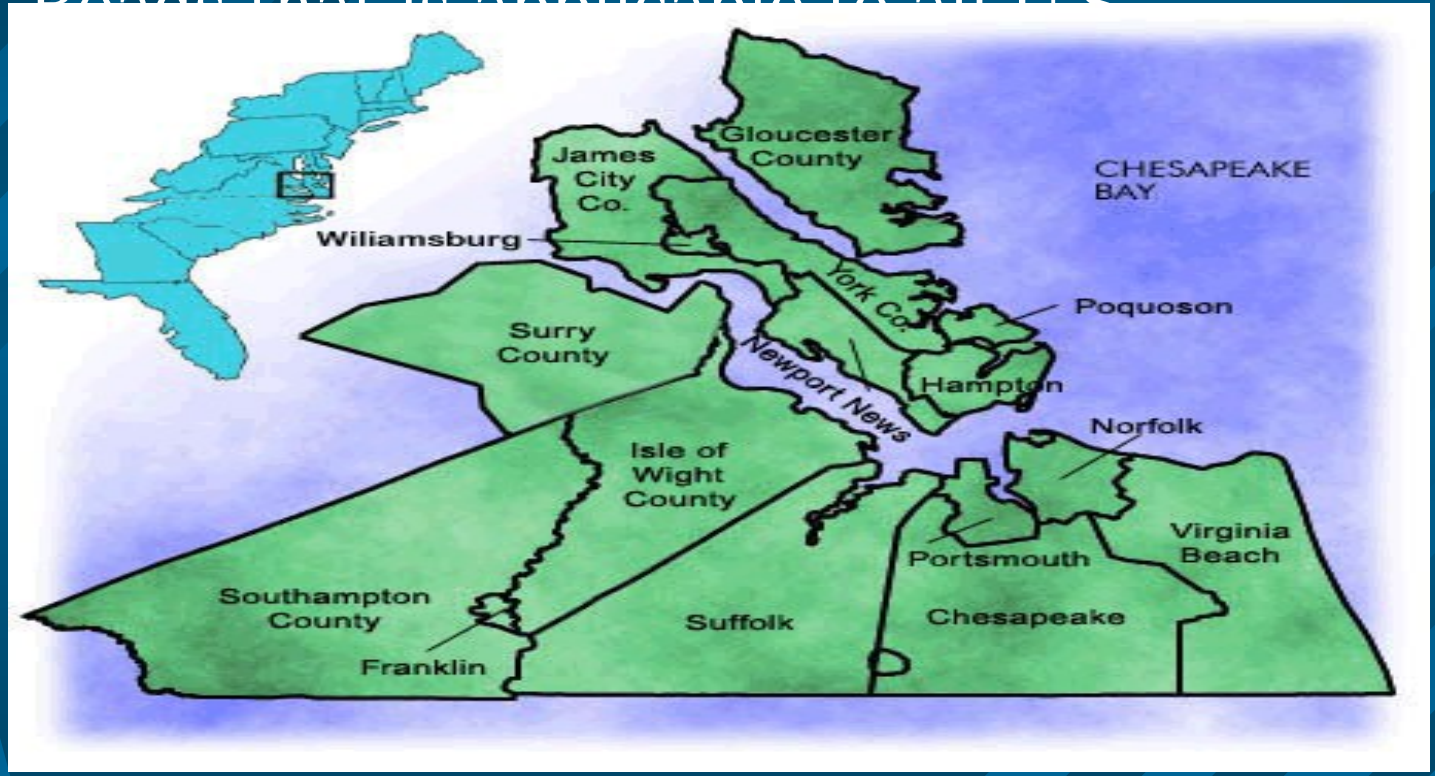
Texas A&M, DREAMS Program Description – R.M. Crooks

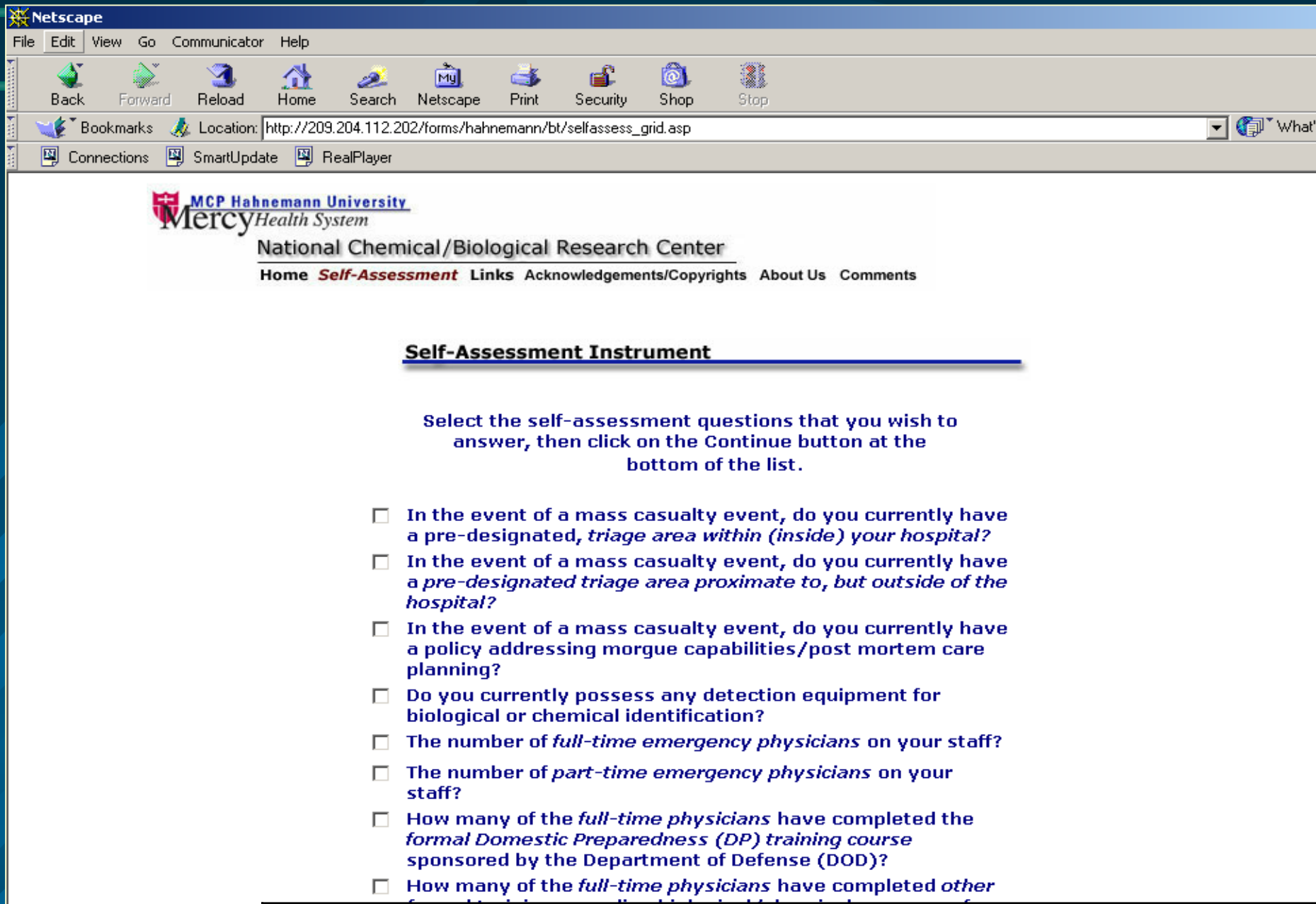
Microfluidic Detection Systems

- **Developed new multi-reactor biosensor for detection of DNA.**
- **Developed new approach for incorporating enzymes into microfluidic sensors and demonstrated proof of principle.**
- **Demonstrated that live cells could be used as sensors within microfluidic systems.**
- **Reported a new approach for preparing arrays of bacterial cells that will eventually be incorporated into biosensors.**
- **Demonstrated a new ultratrace-level chemical sensor that uses**

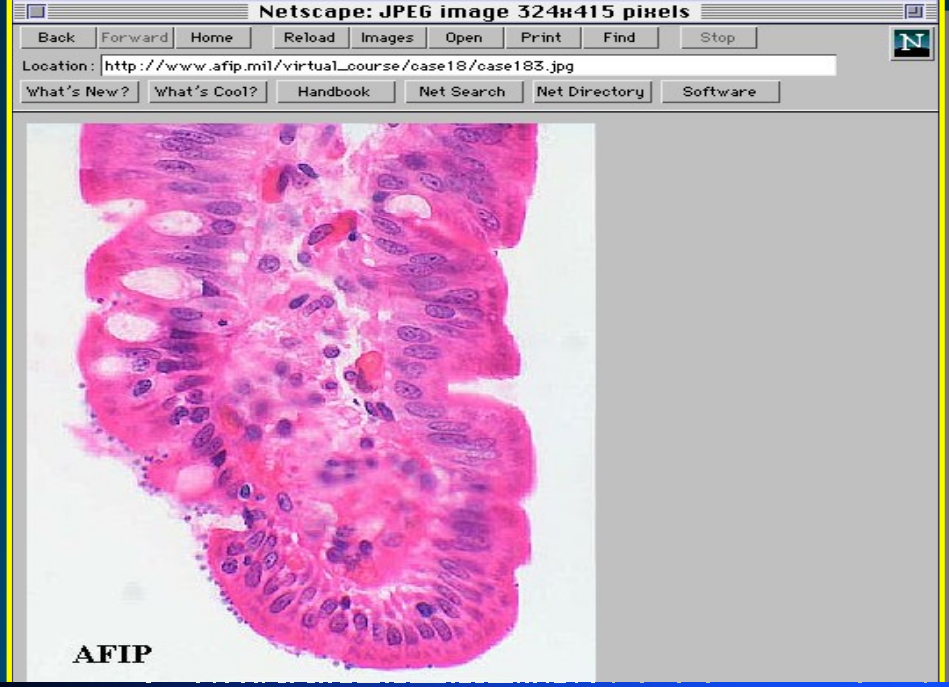
National Center for Collaboration in Medical Modeling and Simulation

- Conduct preliminary data collection and planning for a regional medical preparedness simulation for Hampton Roads that is applicable to all U.S.

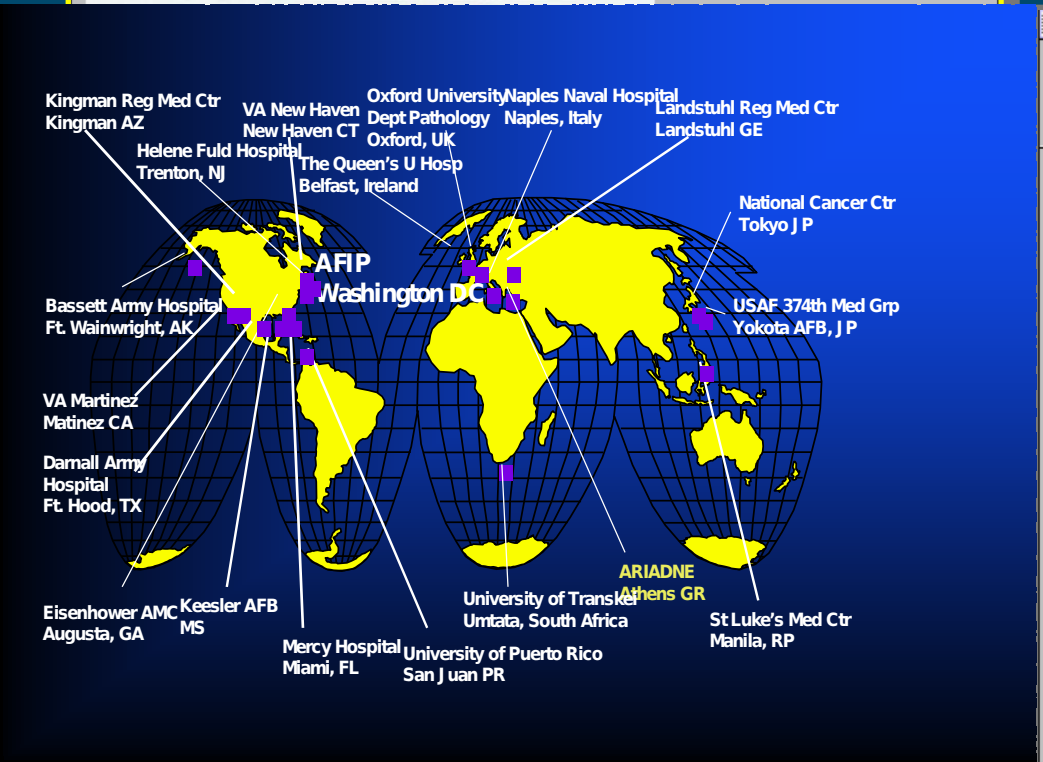


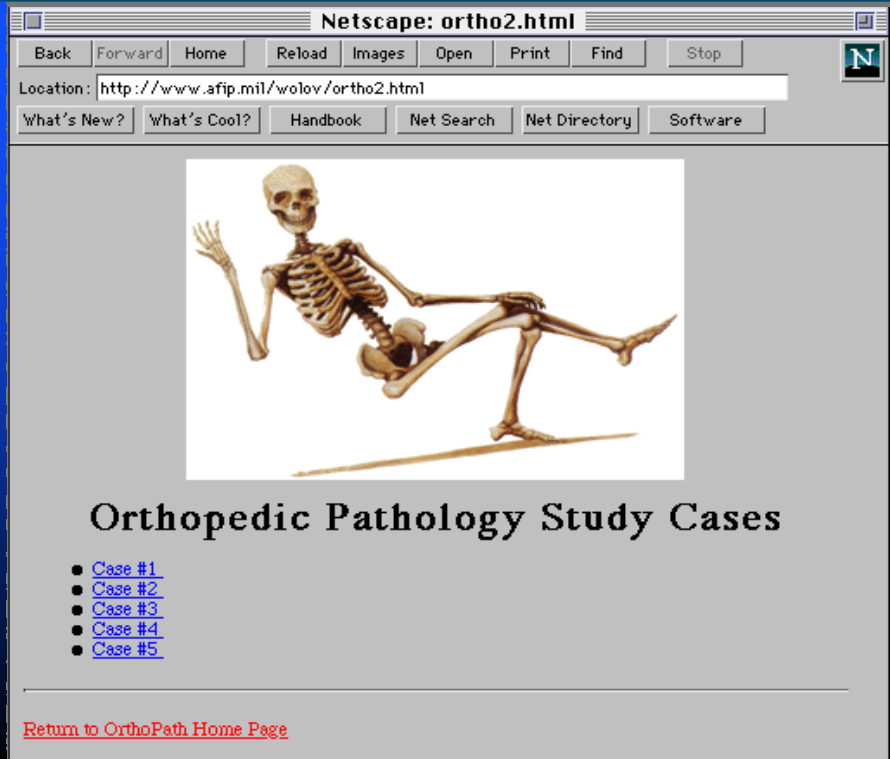

Netscape
File Edit View Go Communicator Help
Back Forward Reload Home Search Netscape Print Security Shop Stop
Bookmarks Location: http://209.204.112.202/forms/hahnemann/bt/selfassess_grid.asp
Connections SmartUpdate RealPlayer
MCP Hahnemann University
Mercy Health System
National Chemical/Biological Research Center
Home Self-Assessment Links Acknowledgements/Copyrights About Us Comments
Self-Assessment Instrument
Select the self-assessment questions that you wish to answer, then click on the Continue button at the bottom of the list.
In the event of a mass casualty event, do you currently have a pre-designated, triage area within (inside) your hospital?
In the event of a mass casualty event, do you currently have a pre-designated triage area proximate to, but outside of the hospital?
In the event of a mass casualty event, do you currently have a policy addressing morgue capabilities/post mortem care planning?
Do you currently possess any detection equipment for biological or chemical identification?
The number of full-time emergency physicians on your staff?
The number of part-time emergency physicians on your staff?
How many of the full-time physicians have completed the formal Domestic Preparedness (DP) training course sponsored by the Department of Defense (DOD)?
How many of the full-time physicians have completed other
Start

- **Validated in 200 hospitals in Pennsylvania**
- **Web Based Tool Provides Minimal Readiness Benchma**


Netscape: JPEG image 324x415 pixels
Back Forward Home Reload Images Open Print Find Stop
Location: http://www.afip.mil/virtual_course/case18/case183.jpg
What's New? What's Cool? Handbook Net Search Net Directory Software
AFIP

Armed Forces Institute of Pathology WorldWide Web-based Telemedicine

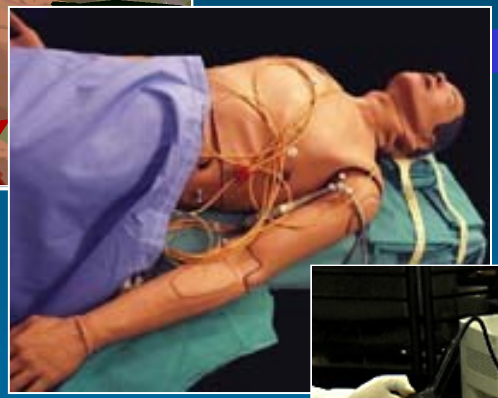




Multiple Technologies

To Meet Multiple Training Needs

PC-based Interactive VR/Multimedia



Digitally Enhanced Mannequins

Virtual Workbenches

Total Immersion Virtual Reality

Tropical Medicine

International Registry of Tropical Imaging

The International Registry of Tropical Imaging serves as a worldwide archiving and retrieval source for imaging studies involved in the diagnosis of over 60 parasitic and infectious, neoplastic and miscellaneous diseases affecting over 2 billion people in the tropical and subtropical regions of the globe.

This is a project of the Radiology Department of the Uniformed Services University.

Submit Cases

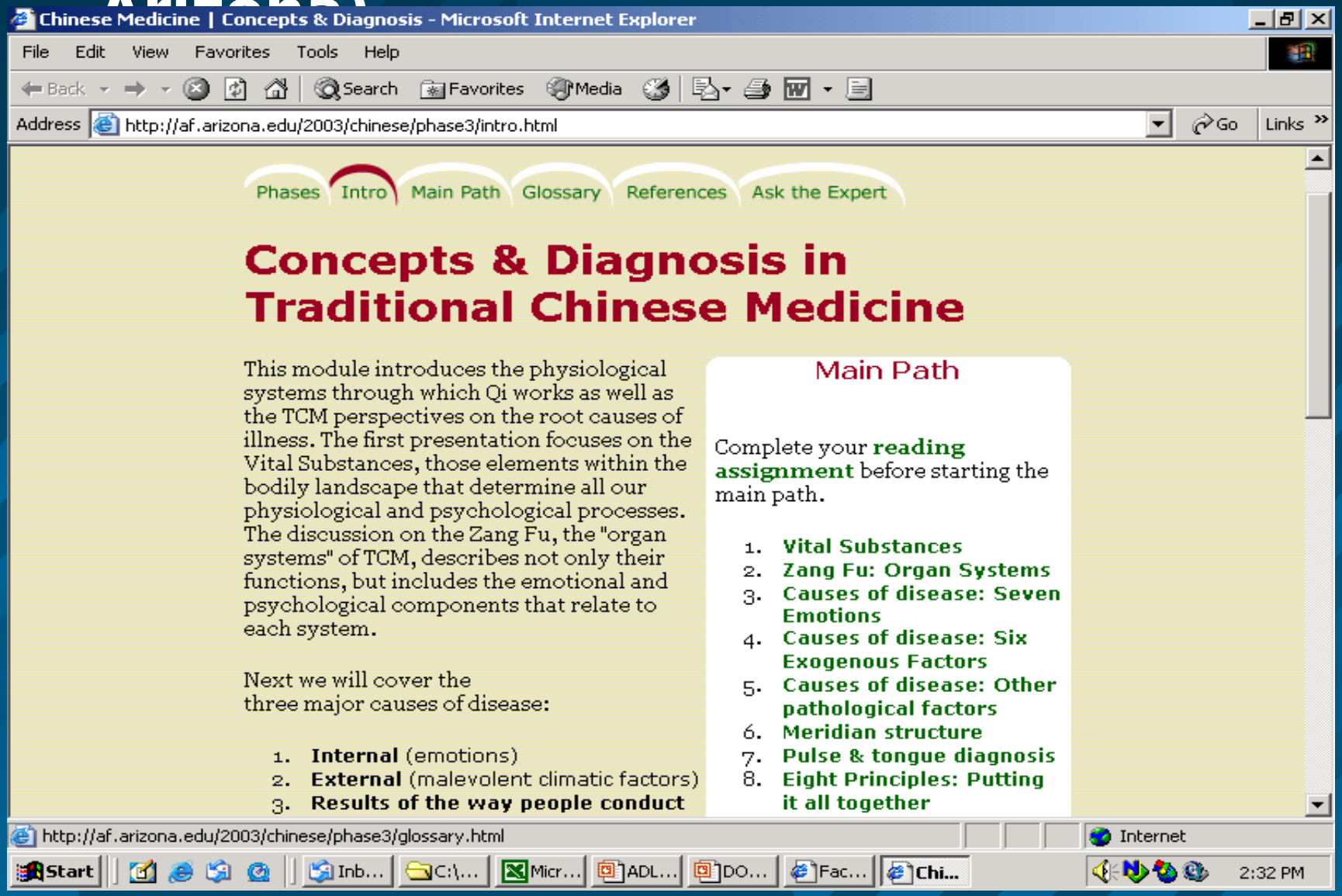
ABOUT TMCR
TMCR DISEASES
TMCR MISSION
TMCR STAFF
TMCR GUESTBOOK
TMCR FEEDBACK
USAMRMC
USU RADIOLOGY

4301 Jones Bridge Road
Bethesda, MD 20814

301-295-3145

A PROJECT SPONSORED BY USAMRMC

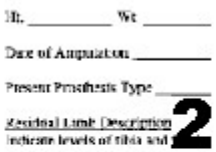
Integrative Medicine Distance-Learning Program (U of Arizona)


Chinese Medicine | Concepts & Diagnosis - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://af.arizona.edu/2003/chinese/phase3/intro.html
Go Links
Phases Intro Main Path Glossary References Ask the Expert
Concepts & Diagnosis in Traditional Chinese Medicine
This module introduces the physiological systems through which Qi works as well as the TCM perspectives on the root causes of illness. The first presentation focuses on the Vital Substances, those elements within the bodily landscape that determine all our physiological and psychological processes. The discussion on the Zang Fu, the "organ systems" of TCM, describes not only their functions, but includes the emotional and psychological components that relate to each system.
Next we will cover the three major causes of disease:
1. Internal (emotions)
2. External (malevolent climatic factors)
3. Results of the way people conduct
Main Path
Complete your reading assignment before starting the main path.
1. Vital Substances
2. Zang Fu: Organ Systems
3. Causes of disease: Seven Emotions
4. Causes of disease: Six Exogenous Factors
5. Causes of disease: Other pathological factors
6. Meridian structure
7. Pulse & tongue diagnosis
8. Eight Principles: Putting it all together
http://af.arizona.edu/2003/chinese/phase3/glossary.html
Internet
Start
2:32 PM

Telemedicine Efforts to Rehabilitate Land Mine Victims

Products - Course

Anatomía Básica Transtibia



Evaluación Prostética del Paciente

Técnicas de Medición

Técnica de Enyesado Prostético

Modificación del Modle Positivo

Fabricación del Forro Blando

Materiales Utilizados en la Laminación Plástica
(Conditional)

Colocación Prostética y Laminación Plástica

Fabricación de la Cuenca y Alineación de Asiento

Sistemas de Suspensión

Alineación Estatica Protesica

Alineación Dinamica

Telemedicine Efforts to Rehabilitate Land Mine Victims

Products - Online C

University of Hawaii
Telemedicine Curriculum

1. **Module 1** Telemedicine Fundamentals
2. **Module 2** Telemedicine Technology & Environment
3. **Module 3** Conducting a Telemedicine Patient Visit
4. **Module 4** Organization & Management
5. **Module 5** Clinical Telemedicine Consult Simulations
6. **Module 6** Telemedicine Applied